What is the 'Value' in the Value Chain Approach?

Smallholder Risk Assessment, Mitigation, and Coping Behavior Among High Value and Conventional Cocoa Chains in Ghana

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ABSTRACT

Over the past 60 years, linking smallholder farmers to global and domestic market opportunities has been an important policy and programmatic focus for governments, non-governmental organizations (NGOs), and private companies alike. Recently, approaches to creating market opportunities for smallholder farmers have included 'value-chains for development.' This approach has been touted as a way to integrate smallholder farmers into higher-value, generally global markets, which promise to increase producer incomes and promote smallholder access to important benefits and services. Looking across the value chain development literature at many of the approaches taken, higher value market opportunities using the value chain approach seem to divide between chains that focus on *certified production practices*, and chains that focus on creating *high value products*. Examples of value chains centered on certified production practices include organic products, products free from child or slave labor, or those that meet specified levels of on-farm biodiversity. The second type of value chains are those concerned purely with product characteristics, whereby methods and cultivation or processing practices are unimportant except for how they contribute to final attributes of the product. These output-focused chains include the cultivation of special or unique varieties aimed at niche or novelty markets, like unique varieties of cocoa or coffee, or non-traditional horticulture exports.

We approach this research with two propositions: first, that shared risk management strategies, and perceptions of risk and benefits may each offer some characterization of the value chains that growers participate in. Second, at a broad, perhaps stylized level, we contend that the generic, 'value chain approach' is often not very helpful in estimating impact, illuminating participation patterns, or describing potential development benefits. This is to say, that not all

value chains are necessarily equal in their potential to create development benefits. We contend that the particular *type* of value emphasized and created along the chain has important and meaningful implications at the farm-level for environmental sustainability, productivity, and household welfare.

To answer these questions we look across three cocoa value chains in Ghana: one that focuses on production practices (Rainforest Alliacnce/Organic), one that focuses on high value, niche products (Fine Flavor cocoa), and finally, a conventional chain. The research is divided into three essays. The first considers if farmers in the same value chain perceive the same risks and benefits of participation. The second looks at how farmers in different chains mitigate and cope with risk. Last, we estimate t how these coping mechanisms, risk perceptions, and value chain benefits might illuminate membership patterns.

The research in this thesis suggests optimism for using the value chain approach as a way to reallocate and redistribute risk, but with several important caveats. First, looking at cocoa chains in Ghana it is evident that growers face systemic risks that are severe, frequent, and pervasive no matter what value chain an individual participates in. However, the frequency and intensity of these shocks do appear to differ amongst chain groups, as do expectations for earnings and other perceived benefits of participation. Second, farmers across chains have similar approaches for risk management, preferring to use savings and other financial tools, followed by labor manipulations, household consumption reductions, and finally the sale of assets. While growers use these 'toolsets' in a similar order, the exact tools used appear to differ. We find evidence that suggests that certain tools may place unique burdens on growers and demand important tradeoffs.

BIOGRAPHICAL SKETCH

Katie Ricketts great up in Southern California believing two things: first, she was a big city person. Second, her older brother was likely the coolest person she'd ever know. After her brother Jeremy joined the Model UN club during college she knew she'd eventually do the same. When she finally went to the UN in New York for a Model UN meeting of university students, another certainty hit her: she wanted to do international development work. She came home and announced this to her family, changed her major, and finished studying at UCLA as an International Development major. Not accepting the fact that she'd do anything other than what she majored in, she took a job opening farmers' markets all over California, generally in low-income areas. One day a farmer called her and thanked her for the opportunity to enter into these new markets. He said it was making a difference for him and his family. It made a real impression on her.

Sometime later she moved on to work at an organic produce distribution company in the heart of the downtown LA produce district. She got up early and got to know the packers, warehouse workers, drivers, and other individuals who make our modern food system work. She realized what a challenge smallholder farmers often faced when trying to integrate into this system. As a produce buyer, she also realized how many of the people who worked hardest in these warehouses were often invisible, and underappreciated. This too, made an impression on her.

Wanting to merge these experiences and skills with an international development focus, she moved to Cali, Colombia to work at the International Center for Tropical Agriculture (CIAT). While there, she worked on projects with people and organizations all around the world, including projects about broccoli value chains in Guatemala, coffee farmers in Costa Rica, and

green bean growers in Honduras. Parte de su corazón todavía está en América Central y Colombia. While she never could get her salsa moves down or learn how to cook bunñelos, she did realize how suited she was to agricultural development research and program evaluation. She left Latin America to come to Cornell for an M.S in Applied Economics in 2011. There she met her advisor, Dr. Calum Turvey and her minor advisor, Dr. Miguel Gomez while pursuing interests in agricultural finance and international food value chains. While at Cornell, spent time abroad in Ghana (e.g, this work) in addition to Malawi where she worked on financial modeling software for NGOs working with smallholder farmers.

She spent two incredible years in Ithaca, a place she thought she'd hate, but actually fell in love with. It was only recently that she realized that she had been giving a lot of her life to the countryside, and not the big city. Perhaps she wasn't the big city person that she always thought she was. So it goes.

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Friends and family

I've spent much of the last two years either abroad or on the opposite coast from my family and many friends. In that time I have lost both of my grandmothers: including my Rara. She is never too far from my thoughts. I am grateful for my own mother, who performed the ultimate act of love when she sat next to me and helped me, during some of the hottest days of the summer, digitize much of the data for this research as I recovered from an injury. She was a meticulous, careful, and cheerful companion. My siblings have kept me laughing, curious, and

ever-excited about life. I'm thankful to have such wonderful lifelong friends. My Dad, has kept me motivated about the future, but always challenges me to live in the present: reminding me to slow down, enjoy the quiet moments, and take care of myself and those close to me.

Friends both old and new have journeyed with me throughout the highs and lows of graduate school. Eva, Chris, Howell, and Lindsay, ensure that Los Angeles remains a place to recharge, recuperate and relax. Along with Nick Cheadle, I thank these friends for the calls, cards, lunches, and conversations that have encouraged me from afar. To Armanda, Meredith, Golzar, Michaela, Devon, and Jesse, you have made Ithaca and New York a place to thrive and call home. Thanks for the adventures, dear ones. To Kevin, thanks for being you: a sounding board, a co-conspirator, a confidant, a friend.

In Ghana

This work would have been difficult, if not impossible without the organization and field support, including office space, equipment, transportation, and housing, provided by the AgroEco-Louis Bolk Institute in Accra and in and around Kumasi. To W.A Toose and Eric Doe, in particular, I am indebted. Throughout my fieldwork these men became collaborators as well as friends who challenged, supported, and believed both in me and in the greater research effort.

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Chapter 1

Introduction: Unpacking the Value Chain Approach

Over the past 60 years, linking smallholder farmers to global and domestic market opportunities has been an important policy and programmatic focus for governments, NGOs, and private companies alike. Recently, approaches to creating market opportunities have included 'value-chains for development' which have been touted as a way to integrate smallholder farmers into higher-value, generally global markets, which promise to increase producer incomes, and promote smallholder access to important benefits and services (Dolan et al. 2003; Humphrey 2005; Kaplinsky and Morris, 2001; Barrett et al. 2011; Carter et al. 1996). The United States Agency for International Development (USAID) has been increasingly focused on value chain investments like those outlined in *Feed the Future*, a complex bilateral initiative that pledges 3.5 billion USD against global hunger by creating better opportunities for income, food security, and nutrition throughout the Americas, Asia and Africa (USAID 2012).

Value chains imply two core elements: chain and value. The chain component refers to the supply chain and the value component to the process of value-addition that accrues as chain actors and processes transform the product in route to retailing (Hawkes and Ruel 2011). Analysis of value chains takes a systems perspective, concentrating on inner linkages between productive activities at the firm, country, and global level, and ultimately uncovers the dynamic flow of economic, organizational, and even coercive activity between producers, suppliers, and

retailers (Kaplinsky and Morris 2001). A 'value chain approach to development' applies the concept of value chains and value chain analysis to creating new and different forms of value chains to enhance development (Hawkes and Ruel 2011).

Ideally, promoting value chains for equitable development means focusing on how income (profits), risks and benefits are distributed along a value chain, with special consideration for the smallholder farmers who engage. Successful integration would assume that smallholder farmers would prefer the level of risk of the 'new' value chain when considering the benefits of participation and the risk management strategies in tandem. If this were not the case, the assumption of individual rationality would dictate that they would refuse to participate and program efforts and funds would be misdirected. These risks and benefits constitute tradeoffs for smallholder farmers, which are generally poorly understood by policy makers and practitioners. With the growing popularity of this approach, WE attempt to unpack this concept into more useful concepts, putting forth a framework for thinking about 'higher-value' chains, and evaluating how growers are perceiving and managing the implicit risks involved in participation.

Research Objectives

In order to understand how value chain approaches can be used as a tool for targeted development, WE look across three cocoa value chains in Ghana in three essays. These include a high-value, Rainforest Alliance/ Organic (RA/org) chain, a high-value, Fine Flavor cocoa chain (FFV), and a conventional cocoa chain (Conv). Each essay explores one of the following objectives:

- Do farmers in the same value chain perceive the same risks and benefits of participation?
- Do chain participants share risk management strategies? What risk coping tools are favored?
- Are risk coping mechanisms, risk perceptions, and value chain benefits important in describing membership patterns?

WE approach this research with two propositions: first, that shared risk management strategies, and perceptions of risk and benefits may each offer some characterization of the value chains that growers participate in. Second, at a broad, perhaps stylized level, WE contend that the generic, 'value chain approach' is often not very helpful in estimating impact, illuminating participation patterns, or describing potential development benefits. This is to say, that not all value chains are necessarily equal in their potential to create development benefits. We contend that the particular *type* of value emphasized and created along the chain has important and meaningful implications at the farm-level for environmental sustainability, productivity, and household welfare.

Value Chains: What is Really Being Valued?

Throughout the value chain development literature and amongst the initiatives that have been undertaken, two distinctions appear to divide practitioners and policy makers in characterizing the 'value' in agri-food chains. The first designates value from certified *production practices*. For example, value chains focusing creating value through production practices can include organic products, products free from child or slave labor, or those that meet specified levels of on-farm biodiversity. The second type value is concerned purely with *product characteristics*,

whereby methods and cultivation or processing practices are unimportant except for how they contribute to final attributes of the product. Agri-chains that focus on creating value through product characteristics include cultivation of special or unique varieties aimed at niche or novelty markets, like those often found in coffee, cocoa, and non-traditional horticulture exports. Both types of high-value market approaches are evaluated in this study.

'Higher Value' Through Product Characteristics: The Fine Flavor (FFV) Chain

Fine Flavor (FFV) cocoa represents a new pilot project in the Ashanti region of Ghana that attempts to link growers to higher value markets by providing fine flavor tree varieties to growers which can be sold for a high premium. Growers were selected to participate in this pilot based on location in ideal agro-climactic growing conditions for FFV beans. As a result, it is important to note that integration into the FFV project and opportunities to reach this high-value market opportunity is neither random nor equitably available in other regions or communities. The FFV project is a joint collaboration with AgroEco, the Ghana Cocoa Board (COCOBOD), and various private sector chocolate producers attempting to install fine flavor cocoa cultivation in Ghana as it does not currently exist.

The Cocoa Research Investigation Group (CRIG), a subsidiary of COCOBOD, undertook breeding for Fine Flavor varieties for the Ghanaian context (interviews with CRIG, 2011). In late 2008, trial beans were sent to Hershey for flavor testing; at the time, none qualified. In 2009, the beans were re-fermented and re-tested with a panel of taste experts representing major chocolate retailing companies. This time, six varieties passed. At a following session, two more varieties were passed as being acceptable fine flavor quality. Today, farmers in the pilot

program are growing all eight varieties with the Ghanaian Fine Flavor project. Approximately 30 farmers are currently participating, with another 60 or so farmers preparing their land and waiting to receive fine flavor seedlings during the remainder of 2011-2012 (AgroEco and COCOBOD interviews, 2011). At the time of this writing (2012), FFV growers are about to harvest their first crop in mid-late 2012. Unlike conventional or RA/org growers, the full production risks –and especially price risks— of FFV have not been fully experienced. Conventional and RA/org growers thus have a historical context from which to anchor more realistic expectations and concerns. This division between FFV growers and the other groups is an acknowledged shortcoming of the study but it reflects the reality of the current stage of the FFV project. It is assumed, however, that FFV cultivation at this point represents an even higher level of uncertainty, and thus provides an interesting opportunity to see the characteristics of growers who are able and willing to cultivate under such great unknowns.

'Higher value' Through Certification of Production Practices: The Rainforest Alliance Chain

Four main voluntary production certification systems for cocoa include Fair Trade, organic, Rainforest Alliance, and UTZ certified (Millard 2011). These systems are accredited by the International Social and Environmental Accreditation and Labeling (ISEAL) Alliance, the major body recognized for voluntary, global certification standards. Each of these detail specific farm management or production principles, with Rainforest Alliance (RA) having the most stringent agroforestry and biodiversity metrics (Heise 2010). Rainforest Alliance farms, like farms producing organic products, are continuously monitored by RA field officers and annually by regional RA monitoring and evaluation staff. In Nyinahin, four field officers work with each RA/org community, performing trainings, trouble shooting, and taking 'stock' of expected RA

yields for the community. As a result of such close watch by RA officers, the approximate amount of cocoa contributed by each participating farmer is relatively known and tight lists are kept. Upon sale to the local purchasing clerk (see a review of the function of purchasing clerks chapter 3) a certified RA farmer has his cocoa labeled and set apart. Initially the farmer is paid the same price as conventional cocoa, with their 'premium' generally coming approximately a month later. This premium is per kilogram (KG) and farmers are paid accordingly through the local purchasing clerk (PC) once AgroEco, the implementing NGO, is paid for the product. The core principle behind these production-focused certification systems is that price premiums and technical assistance for agroforestry practices provides an economic bridge to the longer term benefits of improved farm practices.

RA/org production started in Ntobroso and Nyinahin around 2006. Some farming communities started out growing purely organic cocoa. After a few years, field officers pushed Ntobroso and Nyinahin farmers to adopt Rainforest Alliance principles and peruse certification because some communities were losing organic volume contracts because of insufficient supply—largely due to reductions in yields due to pests and diseases as a result of inadequate organic solutions (for example, the organic spray, neem, is too expensive in terms of labor application costs) (RA Technical Assistant interviews, 2011). As a result, local villages in either region could choose to produce either RA or organic certified products, and may receive a premium for either or both[1]. Conventional growers receive 'bonuses' which are handed down to growers once COCOBOD

[1] Cocoa premiums for organic in 2011 and 2012 continue the trend of being higher than those given for RA product.
[2] As will be discussed later, the rigorous quality control by the Ghanaian government preserves Ghana's reputation as providing the 'gold standard' in cocoa production. Conventional product from Ghana is priced at approximately 10% higher above global prices due the ability to source high-quality cocoa in bulk.

has established the farmer price and determined quality levels to be adequate[2]. All growers receive the conventional price of cocoa at the time of sale, with premiums (and bonuses) arriving sometime later.

For RA/org, the local purchasing clerks get a list of what types of cocoa (either RA or organic) are produced by which farmers and expected yields (based on the previous years production). Like all cocoa production, yields can increase or decrease because of weather, disease, and rainfall. Each farmer has a file with inspection information and a volume 'contract' which serves as a guide for expected production. The farmers' land is also included in a hand-drawn map of other RA/organic production areas, which includes not only cocoa producing areas, but areas where food crops are being grown, and where buffer zones and protected areas for water, soil stability, and push-pull pest management areas exist.

Research Outline

The research progresses as follows. Chapter 2 discusses the data and basic methodology for the research endeavor and the analysis approach is explained. Chapter 3 proceeds with a review of cocoa markets and industry dynamics. Following this, Chapters 4, 5, and 6 comprise the three essays which encompass the objectives of this study. Each of the essay objectives includes a relevant literature review introducing important concepts and theories, explains methods used for analysis, and describes findings. Chapter 7 concludes this research and outlines future areas ripe for continued exploration.

[2] As will be discussed later, the rigorous quality control by the Ghanaian government preserves Ghana's reputation as providing the 'gold standard' in cocoa production. Conventional product from Ghana is priced at approximately 10% higher above global prices due the ability to source high-quality cocoa in bulk.

Chapter 2

Survey Methods and Data Collection

This section broadly describes data and methods used throughout this research. Relevant data and specific methods related to essays 1, 2, and 3 of this study are described in chapters 4, 5, and 6 respectively. This chapter focuses on the overall data collection process and broadly describes the information gathered and the method by which important concepts—like identifying growers with a particular chain—were approached.

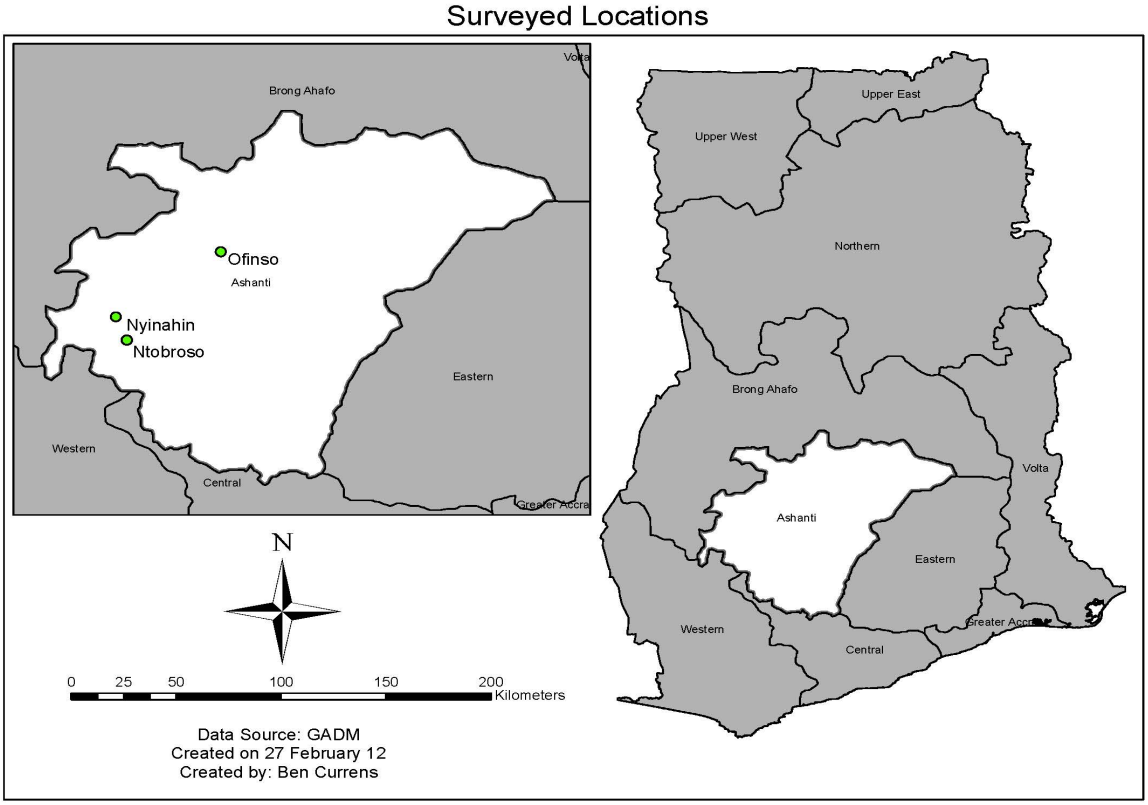
Research undertaken in Ghana surveyed 177 smallholder farmers in the Ashanti region of Ghana (Figure 1). The cross-sectional data set was collected during the summer of 2011 in the provinces of Ntobroso, Nyniahini, and Offinso all of which are located in Ashanti region. The Ashanti region is one of the main cocoa growing regions of Ghana; a critical source of both employment and income for many of the over 3 million people that live in the area[3].

Collaboration with AgroEco and local technical assistants (TAs) for Rainforest Alliance/organic growers (henceforth RA/org) helped facilitate meetings with communities engaged in RA/org production and conventional production. Project managers with AgroEco helped identify and introduce fine flavor (FFV) growers and conventional communities. The opportunistic interviewing of individuals was considered an asset in terms of reaching a myriad of growers within a specific community as word traveled by mouth. That said, this research should not be confused with being a random, large-scale survey. It is entirely possible that some groups may

[3] Source: Ghana Health Service based on 2000 Housing and Population Census, Ghana Statistical Service. This figure does not include the urban population of Kumasi.

have been missed or neglected – either because they are less socially connected to participants who knew about the study, or because they currently are not on the radar of the TAs, the AgroEco project managers, or others who helped as facilitators of the data gathering process.

Figure 1: Survey locations



Source: Author's creation with Ben Currens

Fieldwork details include the hiring of four enumerators for pre-testing, and survey extension, in addition to in-country interviews with the Cocoa Research Institute of Ghana (CRIG), the International Institute of Tropical Agriculture (IITA), Armajaro Licensed Buying Company (international buyer and trader), AgroEco, World Bank Risk Management staff, and industry interviews with retailers like Hershey and Mars.

Survey Instrument

The instrument was comprised of almost 200 questions within six main areas (See Appendix). These areas included: basic information, household and individual characteristics (education, housing conditions, distance to major road, etc.), production and selling (plot acres, ownership, cocoa cultivation, production per acre, labor and input costs, etc.), perceived risks and benefits of participation (access to services and tools from value chain participation, importance placed on various risks and benefits of participation, etc.), income and assets (household income, cocoa revenue, income diversification, consumption priorities, access to credit and finance), and finally, perceptions of poverty (feelings about current level of welfare, comparisons between neighbors and level of wealth over time).

Identification of Growers into VC Groups

Since this study is about what characterizes growers in particular value chains and how they react to perceived risks and benefits, and engage in risk management, assigning growers to a particular chain was to be done with care and empirical conviction. Growers within this sample may grow a high value variety in addition to conventional cocoa, a practice that is common throughout the country. In this study, almost all FFV growers grew cocoa for two separate markets as they were limited in growing only one hectare of FFV cocoa during the current pilot phase. Many remain actively engaged in conventional production. As a result, it is certainly unclear if farmers think of themselves as the 'type' of grower that they are identified as within in this analysis. When identified as program participants, these growers were asked to speak about their experience and expectations only of high value cocoa. Understanding risk perceptions and coping strategies was undertaken in order to understand if these 'adopters' differed somehow

from their counterparts who were growing Rainforest Alliance or purely conventional product. However, we can gain important insight into the characteristics of these 'early adopters' and record interesting differences during these initial phases. Note that at the time of this survey it was not possible for a grower to cultivate both Rainforest Alliance and FFV since they are separate programs administered by AgroEco occurring different parts of the region.

Determining Rainforest Alliance growers from conventional growers was somewhat more difficult. In the instance that growers grew both varieties they were sorted according to the majority percentage. We asked about all cocoa plots cultivated and the kinds of cocoa on each of these plots. From this *cocoa_total* we grouped growers into one of the three value chain groups when they had over 50% of their cocoa cultivation growing for that particular value chain (*FFVGrower, RAGrower, CONVgrower*). These categories were then coded and grouped into a single variable: *GrowerVC,* which included sorting into either RA/organic or conventional, in addition to growers known to be FFV participants (Table 1).

Table 1: Grower value chain breakdown

Grower VC	**Sample Size**
FFV	22
RA/org	69
Conv	86

Data Shortcomings

For some results, comparisons between FFV and Rainforest Alliance/organic communities is a

challenge as the FFV chain is a new, young project that is less than five years old. FFV grafting onto existing root stalks meant that FFV growers could mature trees faster, but growers still lack a meaningful trade and production history. This lack of history does not allow for realistic anchoring of FFV expectations and FFV growers may be widely optimistic or unreasonably cautious. Conventional and RA/org growers have a solid history behind them, which is perhaps meeting their expectations, or perhaps not. Controlling for any level of real or imagined 'frustration bias' or dissatisfaction would be difficult, perhaps impossible, in the conventional or RA/org group.

A small sample for the FFV group proved problematic for some of the analysis, though possible heteroskedacities issues were mostly addressed by validating tests for normality. In terms of the data, there are only approximately 50 farmers engaged with the FFV program, 22 of whom had trees at (or close to) a stage mature enough to harvest. All 22 of these growers are a part of FFV sample, which means that this data collection constitutes the entire population of FFV growers. Even still, the small sample size proved difficult in terms of high levels of variation between responses.

Lastly, when thinking about price risk, we don't know what the true variation will be for FFV beans which originate from Ghana. Like the wine industry, seasonal changes and shifting buyer preferences can make a region or a variety a blockbuster 'hit' or a total flop. We can estimate FFV price variation from other regions which cultivate FFV beans (namely Latin America and Madagascar), but the difference in climate, taste profile, level of government involvement, access to financial markets, and foreign-direct investment from multinational companies makes comparisons problematic. How fair it is to compare FFV production, which is marked by price

volatility through elevated demand elasticities and the (perhaps) more stable RA/org market remains to be seen. Yet these differences in value chain dynamics represent a key point of this research as it asks how the value chain approach can be better understood in terms of the risk management approaches taken by farmers. Ultimately, how these opportunities translate into preferable or appropriate participation opportunities for the rural and urban poor can and should remain the ultimate benchmark.

Fieldwork photos (2011):

Clockwise starting from upper left: Ankrah (enumerator for this study) and a child in Ashanti, (upper center) cocoa beans from cooperative, (top right) enumerator (Ankrah) interviewing a woman and her children in Ntobroso, (bottom right) Eric Doe from AgroEco, (bottom center) Rainforest Alliance Technical Assistant and his daughter (Ntobroso), (bottom left) Katie discussing the flow of organic cocoa in with cooperative leaders, (center left) Rainforest Alliance grower in Ntobroso, (center), field team in Nyniahini; Katie, Frank, Charles, Asamoah Joseph, William, Ankrah.

Chapter 3

Cocoa Markets and Industry Dynamics: A Review

Cocoa is a tree crop grown almost entirely by the rural poor living in the tropics. West Africa produces almost two thirds of the global cocoa production; over 2,693 thousand tons over 2009/2010 (ICCO 2010). Growers in West Africa cultivate the trees on a plot size that, on average, is less than two hectares (Dand,1999 as cited in Fold, 2001; Gilbert, 2008; Barrientos et al. 2008). The supply powerhouses of Côte d'Ivore and Ghana lead production in the region in addition to substantial production in Nigeria, Cameroon, and Togo (Gilbert 2008; ICCO 2010). In Ghana, over 720,000 rural growers depend on the crop for a large percentage of household income (Barrientos et al. 2008). Annually, the crop accounts for over 18.9% of Ghana's agricultural GDP (Bresinger, et al. 2008). In each of the West African countries, significant foreign investment and active government intervention ensures that cocoa production is economically, and politically, important.

The cocoa-chocolate value chain is complex in terms of products, processes, and actors involved. Cocoa processing and chocolate manufacturing each break down into intermediate stages, which output a variety of finished consumer products or unfinished industry products. As a result, smallholder farmer incomes often represent a small share of retail price; a dynamic which many international development agencies and governments seek to change. For development agencies and governments trying to increase rural incomes, linking smallholder producers to higher value cocoa markets and enabling greater productivity is pursued as an objective of pro-poor economic

development. This priority has often translated to policies and programs aimed at providing cocoa growers with options like organic, Fair Trade, and Fine Flavor varieties, all which garner a premium in international cocoa markets.

This international development perspective dovetails with an important and growing movement amongst private sector players. In order to address diminishing quality internationally and reduced on-farm productivity, companies along the cocoa-chocolate value chain are looking invest in their supply chains and build capacity for product access and quality. Much of this work is being targeted at the smallholder farmer level and includes effort to increase smallholder productivity, train on farm management practices for higher quality, and identify new cocoa types and varietals. Indeed, what was once an undistinguishable commodity is now being differentiated based on characteristics like product origin, variety type, farm management practices, quality and climactic features. Ultimately, companies are pursuing these efforts in order to strengthen existing procurement links and to respond to new and growing consumer and industry markets.

This paper focuses on the evolution of cocoa markets in West Africa, particularly in Ghana, where the work of this study is based. This section synthesizes a variety of work that explains how cocoa markets are changing and why. First, a historical background gives a contextual backdrop on how important players and processes emerged. In the second and third section, we look at important market shifts, including changes in demand composition and available supply. This section looks at important, emerging high value cocoa markets, including specialty cocoa like those that are described as 'fine flavor,' and those certified by good farm management practices like Rainforest Alliance or organic. Following this we outline conventional cocoa

value chains in Ghana and the methods by which smallholder farmers are given credit, technological assistance, and other supportive services. In conclusion, we consider the opportunities and challenges for smallholder farmers given these changing dynamics.

History and Background

The cocoa trade in West Africa was established during the colonial era. Since the 1920s, West Africa has been the leading region in global cocoa production (Fold 2001). Even after independence, much of the British and French infrastructure—including centralized procurement—remained. The standard crop marketing structure adopted in British colonies included state marketing boards, central financing and planning, and national research and development bodies. The French system opted for private sector participation within a government control system of pricing and licensing (Gilbert 1997; Gilbert 2008). In much of West Africa, a good deal of the physical infrastructure and processes instituted by the French and British have remained and continue to be of use today.

A wide body of literature points to three main periods that characterize the evolution of cocoa markets and key players involved. First, in response to a global downturn in commodity supply after the Great Depression, government engagement and control of commodity production was supported as a critical method of reducing volatility and stabilizing supply during the 1940s-1970s (Haque 2004). During the 1950s and 1970s, this predominantly took the form of international commodity agreements (ICAs), buffer stocks, quotas, and support prices as agreed upon by producing and consuming country governments (Gibbon 2003). Agricultural commodities were seen as an opportunity to establish a broadly based social infrastructure and national identity through resource-based industrialization (Gibbon 2003). Similarly, donors,

development agencies, and international research entities were actively investing in agro-commodities; World Bank projects alone covered 8.4% of the global cultivated area for cocoa during 1961-1990 (Shiff 1995, cited by Gibbon 2003).

By the 1980s, the financing mechanisms coupled with the ICAs had been drawn on extensively. Combined with historically low commodity prices and a pervasive market-led development trend, Northern governments and donors began deconstructing the political and economic arguments against government intervention in commodities (Gibbon 2003; Gilbert 2008). Disengagement by donors followed and commodity producing governments were urged (by political and economic tactics) to liberalize commodity control. 1990s and beyond have focused on public-private initiatives including price risk management tools, diversification, value addition, and public private partnerships (Classens and Duncan 1993; Gibbon 2003; Haque 2004). Liberalization in Ghana and elsewhere aimed to improve productive efficiency through alignment of domestic prices with world prices and to give cocoa farmers a higher price in relation to the f.o.b price (Haque 2004). Signs of success and failure towards these objectives in the West African region are discussed in the section on prices.

Unique circumstances in each country required a unique approach to deregulation. A modest liberalization occurred during 1992-1993 in Ghana, where state control of cocoa marketing and farm-gate price setting still exists through the state-run Cocoa Board (COCOBOD). COCOBOD acts as monopoly exporter of cocoa through its subsidiary, the Cocoa Marketing Company (CMC). All cocoa is procured by the CMC for final export sale and farm-gate prices are set annually by the government. These usually remain current for the entire crop year (Gilbert 2008). Towards this end, COCOBOD carries price exposure for the entire crop over the season.

COCOBOD mitigates against price risk through forward contracts in the terminal markets and also with large, global grinders (Gilbert 2008).

Selling Ghanaian grown cocoa outside of the CMC is considered smuggling, and is punishable by law. Changes during the restructuring of the cocoa markets in Ghana included opening up domestic buying to companies licensed by COCOBOD. In effect, this means that private companies can buy from smallholder farmers, amass product, and sell up the chain to the government. Many of these licensed buying companies (LBC's) are subsidiary companies owned by international exporters and traders who interface directly with CMC for final purchase.

Cocoa-Chocolate Value Chain: Players and Processes

Cocoa is used for making chocolate food and beverage products. These include plain and milk chocolate bars and those with a filled center (e.g., cereal, fruit, nuts), in addition to chocolate beverages, powders, liquors, and other novelties. These may be created and finished for retail consumer markets, or unfinished for industry markets (like cocoa powder for cakes or cocoa butter for healthcare products).

Cocoa pods are harvested annually from cocoa trees. The beans inside the pods are removed and fermented and dried in the sun. The dried beans are then exported, usually by boat, to grinders in Europe, North America and, increasingly, Asia. After being crushed and roasted, cocoa must grinded. During the grinding process, cocoa is processed into liquor for chocolate or liquor for further processing. Liquor for chocolate moves into product lines for finished chocolate products (solid bars or filled chocolates) and sold to retail. Liquor for processing describes a process of further pressing cocoa liquor to extract cocoa butter and powder. UNCTAD (2008) provides a

helpful list in designating product categories for cocoa based on different stages of processing, including:

1. Cocoa beans (raw, dried and fermented)
2. Semi-finished cocoa products (cocoa liquor, butter, and powder)
3. Industrial chocolate (blocks, slabs, or bars in liquid, paste, or powder that will be added to other food products)
4. Finished chocolate products for retail

Cocoa processing and chocolate manufacturing ensure that cocoa is a more heterogeneous product than final products derived from similar commodities like coffee. Chocolate requires additional important, variable inputs, including milk and sugar. A single chocolate company may thus be exposed to several volatile commodity markets and have procurement and sourcing programs scattered all over the globe with varying levels of risk and accessibility. As a result, the price of cocoa can account for only a percentage of the final product price. For nine major chocolate products ranging from solid chocolate bars to liquors, cocoa accounted for, on average, 39.4% of the raw material input cost (Gilbert 2008). Evaluating a cocoa producer's share of a retail chocolate product price is therefore much more complicated than it would seem. Calls for increasing the smallholder cocoa farmer's share of the retail price may not be a useful metric for determining whether or not cocoa growers are receiving a fair or livable wage.

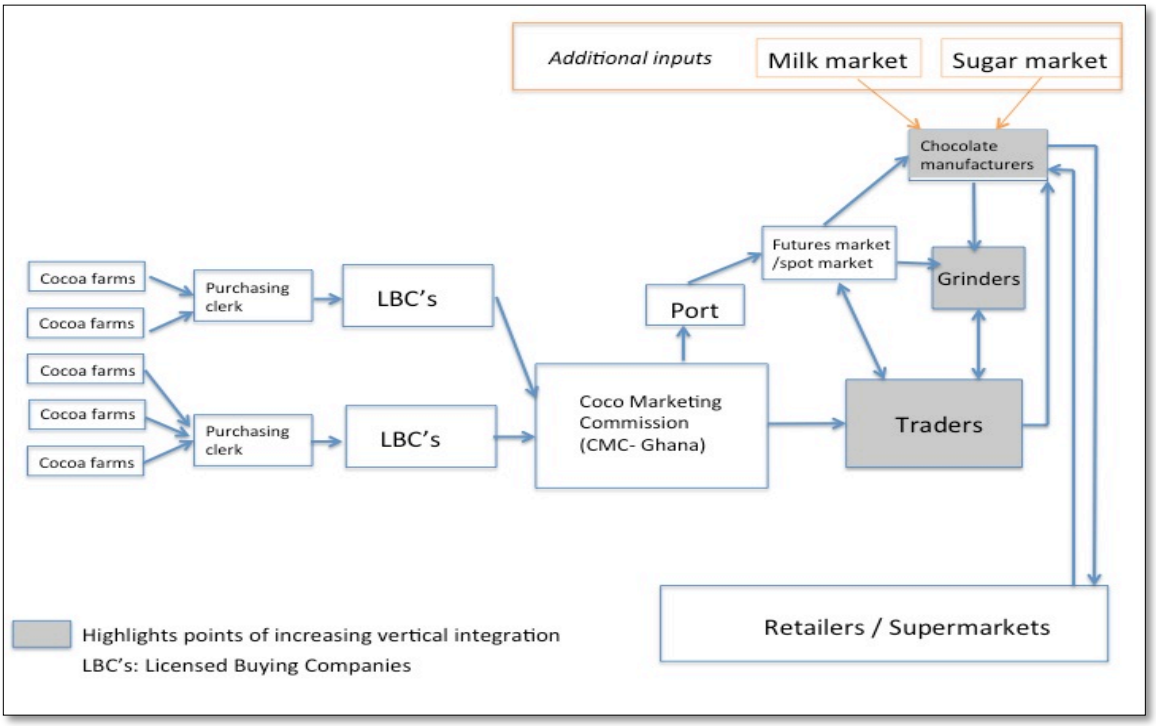
A handful of major players and companies dominate the cocoa and chocolate industry. Distinctions can be made between traders, cocoa processors (grinders), and final chocolate product manufacturing companies or "big brand" companies (Barrientos et al. 2008; Fold 2001). In recent decades, consolidation and centralization has occurred in all three stages with

companies vertically integrating at each of the major levels (UNCTAD 2008). Trading and export functions may be facilitated by specialized cocoa buyers and hedge funds, like Armajaro Trading Limited[4] in the U.K, a government marketing board (e.g., the CMC in Ghana), or is controlled by multi-national grinders. With the exception of government marketing boards, most of the main trading companies in cocoa engage in some level of grinding; a dynamic which supports ever-concentrating buying power though accelerating economies of scale (UNCTAD 2008). Today, three multi-national giants dominate grinding activity including; Cargill, Archer Daniels Midland (ADM), and Barry Callebaut. Combined, these companies account for over 75% of total annual grindings (Fold 2001; UNCTAD 2008). To give a sense of the pace of consolidation, only twenty years ago there were close to 40 grinders located in Europe alone (Fold 2001; Gilbert 2008). Cocoa traders and grinders wield significant power in the cocoa marketplace, functioning as transmission channels that convey market information, standards and prices from consumer to producer countries (UNCTAD 2008).

In Ghana, the Cocoa Marketing Board (COCOBOD), controls cocoa supply as it functions as an monopsony. As the single buyer within-country, COCOBOD then sells cocoa on the global market to the major grinders, traders, and multinational companies. This system makes collusive behavior and a priori information possible, which can diminish market efficiency (UNCTAD 2008). A simplified diagram of the cocoa-chocolate value chain originating in Ghana can be found in Figure 2, below:

[4] Armajaro Limited Company is a commodities trading company with headquarters in London. The company trades heavily in cocoa in West Africa (http://www.armajaro.com/). Armajaro Ghana Limited is a licensed buyer in Ghana (LBC), a subsidiary company of Armajaro Limited Company, that purchases cocoa from farmers, sells to the Cocoa Marketing Company (CMC) in Ghana. The CMC then sells the product to companies in the international cocoa market, at which point Armajaro Limited Company to purchase and legally own.

Figure 2: Cocoa-chocolate value chain (Ghana)



Source: Author's creation 2012

Traders and grinders ultimately sell chocolate inputs (liquor, butter, etc.) to a small group of powerful big-brand chocolate production companies including Nestle, Mars, and Hershey (UNCTAD 2008). Combined companies service over 75% of the consumer chocolate market (Tiffen 2002). These chocolate manufacturers may engage in some grinding, but estimates from UNCTAD in 2006 point to less than 10% of global milling capacity. The majority is outsourced to abovementioned global grinders who have coordinated their activities to provide consistent, inexpensive supply.

A new development in consumer markets is the onset of global supermarket chains like Wal-Mart, Carrfour, Ahold, and Tesco, who are increasingly challenging the consumer market territory of big-brand chocolate companies. Using 'own branding' or white labeling, grocery

retailers are providing chocolate products along side famous chocolate brands and generating significant market share. In the UK, branded supermarket chocolate products accounted for over 55% of all chocolate confectionery retailed (Barrientos et al. 2008).

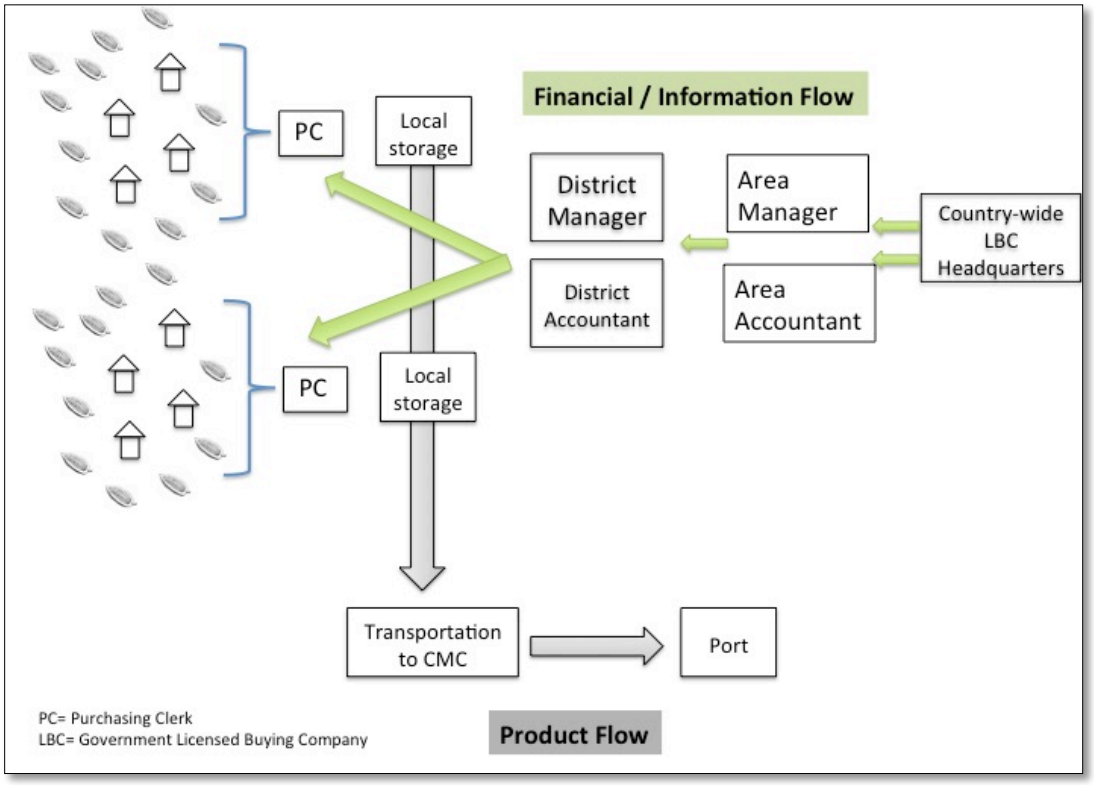
Global Supply Dynamics and Cocoa Production in Ghana

Global supply of cocoa is evaluated by stocks-to-grindings ratios. World stocks of cocoa beans are held in cocoa importing countries (mostly) and are used to determine prices and product liquidity for both futures and spot markets. Erratic weather during 2009/2010 reduced cocoa production by 2.4% globally, whilst demand maintained a steady increase (ICCO 2010). This, combined with yield challenges due to pests and disease, political instability in key production regions like the Ivory Coast, and movement of smallholder farmers away from cocoa production (likely due to more lucrative transitions to rubber and palm oil), resulted in a third year of cocoa supply deficit (ICCO 2010; 2011 industry interviews). Over 3.7 million tons of cocoa were sold between 2009/2010, with Africa accounting for 68%, Asia at 17.5%, and Latin America at 14.4% (ICCO 2010).

Ghana produces between 18-20% of global cocoa supply (Gilbert 2008; ICCO 2010; Barrientos et al. 2008). Cocoa production in Ghana is regulated by the Coco Board of Directors (COCOBOD), a government owned entity divided into five subsidiaries. These entities include the Quality Control Division (QCD), Cocoa Research Institute of Ghana (CRIG), Cocoa Swollen Shoot and Virus Disease Control Unit (CSSVDCU), the Cocoa Marketing Company (CMC), and the Seed Production Unit (SPU). COCOBOD licenses buying companies who buy, aggregate, and transport cocoa for final sale to the Cocoa Marketing Company (CMC). Smallholder farmers ferment, dry, and pack cocoa beans in 50kg bags. These bags are brought to a local

purchasing clerk (PC), a local from the village who is hired by a particular LBC to buy on behalf of the company. A generalized model that describes the downstream financing and information flow as well as the upstream product movement which is used by LBC's in Ghana, can be considered below.

Figure 3: Downstream and upstream flows for Licensed Buying Companies in Ghana



Source: Author's creation, 2011

LBC's train and hire their own PC's, so multiple PC's may exist in a single village, if the region has enough volume. Information obtained during in-country interviews with LBCs in 2011 discussed the hierarchy of product movement, financing, and organization. It was noted that PC's are generally not salaried staff, but are typically paid on commission and responsible to a larger, District Manager (DM). For many LBC's, the DM is not an employee of the LBC but rather is a contractor or 'entrepreneur' responsible for a certain amount of cocoa and paid on commission.

He or she is responsible for identifying, training, and monitoring the PCs who can fulfill cocoa volume obligations. A Ghana-based LBC estimated that DMs were responsible for an average of 30 PC's in close to 50 regions. Along with DMs are District Accountants, who are not paid on commission but are on payroll with the LBC. District level staff report to one of four Area Managers and Area Accountants. Together with the Area Managers, LBC Headquarters sets targets for product accumulation on a seasonal (but flexible) schedule. On a weekly basis, the Area managers are in touch with the District managers, sending funds for buying beans and monitoring process on regional target volumes. The amount of financing that occurs along the chain is substantial. Cash must flow from Headquarters through the Area Managers, though the District Managers and down to local PC's even before product has been verified (See Figure 3), since all purchases happen at the district level at local warehouses. In 2011, an LBC reported that on average, 30,000 bags are accrued from a given district in a single season (2011 industry interviews with the LBC, Armajaro Ghana Limited). If a 50kg bag is worth 300 GH on the global market (2010 estimate from Armajaro) over 6 million GH flowing through the chain for a single district. When we consider that there are, on average, 50 districts, cocoa financing for a single season for a single LBC can tally to around 300 million just for product purchases.

The DM is contractually responsible to the LBC for reaching product volumes and accounting for credit at the local level. The DM is required to have significant collateral (usually a residence) against the loans given from the Area Manager to the DM for product purchases and smallholder credit extension. Ensuring that local PC's accumulate the entire expected product is essential. Relationships between the DM's and the PC's are deeply personal and closely

monitored. LBCs pointed out that DMs are usually hired on his/her ability to effectively manage a team of PCs that he/she identifies as good 'business people.'

The relationship between the PC and local farmers in a given community cannot be understated. The local PC provides two critical functions for smallholder farmers. First, a PC may help farmers facilitate access to fertilizer and other tools for little or no cost. For example, interviews with PCs in Ashanti described how farmers can place an order for fertilizer by putting down half of the full payment that they would pay in the local market (15 GH in 2011). Using 2011 prices, the local market price (wholesale) is currently 28 GH. The local PC may provide transportation for 2 GH charging farmers a total cost of 30 GH. The PC delivers the fertilizer and allows the farmer to pay the remaining 15 GH with cocoa beans, which is essentially in-kind credit that can be repaid at harvest. For farmers, they pay for convenience and cheap delivery in a country where transportation may be difficult. For PCs, this service secures bean "delivery" during important harvest periods.

Additionally, the PC serves as a local creditor that provides relatively cheap and easy to access funds. For a credit constrained, rural village in Africa, this is a critical function. The PC makes loans for funerals, weddings, and other social events, as well as on-farm investments. Generally, the borrower has to pay back within one year or else they pay 100% interest at the end of 12 months. During those 12 months, however, most farmers pay no interest. This appears to function similarly to a rotating credit fund, with compliance enforced by strong social ties between farmers, their PC, and their village which illuminate credit worthiness and support chances for full repayment.

Improved access to affordable credit and pre-harvest finance is central to raising productivity levels in Ghana (Phillips and Tallontire 2007). Formally, most LBC's in Ghana insist they are not in the business of loaning money or doing direct lending (LBC interviews, 2011). That said, it appears that cocoa operates as a currency in most cocoa producing villages with the PC's functioning as micro-lending institution. This money is fronted by LBC's in anticipation of being repaid (both principle and, occasionally, with interest) with cocoa. Loaning money throughout the year through the PC's acts as both supplier-credit for import seasonal imputs and purchases, as well as for household consumption needs. PC's (and, by extension, LBC's) use lending and credit as mechanism to access and lay claim to cocoa supply. Intense competition between PCs in the village and amongst LBCs within the country, ensure that incentives, be they large or small, really matter. This includes small promotions (like giving out boots or cutlass) and fertilizer delivery schemes, in addition to big incentives like annual credit extension. As a result of this service delivery, the PC's tend to be highly respected individuals in the community who may hold significant power, which may be used to exclude or coerce.

Yields and Prices

Current COCOBOD policy is to reserve approximately 70% of FOB price for producers (Gilbert 2008; Barrientos et al. 2008). Since the government markets and negotiates prices in international markets, it covers any risk of FOB prices falling below the amount allotted for local producers. When a surplus price exists, the government takes the residual. In order to encourage quality cocoa, COCOBOD pays a bonus to conventional farmers when cocoa passes supreme quality inspection. While many farmers consider this bonus to be inconsequential in its contribution to actual income, high levels of Grade 1 bean quality coming out of Ghana fetch a

premium price in international markets (Fold 2002; farmer interviews in Ghana). This is known simply as the "Ghana premium", which is approximately an additional 100 USD per tonne, when compared to beans from Cote d'Ivoire due to the high fat content and rich flavor of the beans (Fold 2002). This allows Ghana to sell more of its cocoa forward – which provides greater export stability and revenue projections (Barrientos 2008; Fold 2001). The high quality of Ghanaian beans is due to a well-established quality control and standardization system implemented by COCOBOD.

Although Ghana is recognized for producing high quality, conventional product, the vast majority smallholder farmers experience exceptionally low yields per hectare (Dorman et al. 2004; Barrientos 2008; Fold 2008: Laderach 2010). This is attributed to incidence of pests and disease, non-adoption of technology, and inappropriate (or absent) input usage (Dormon et al. 2004). Low purchasing prices combined with high levels of production risk discourages farmers from investing large amounts of money in the farm upfront (Fold 2001; Pinnamang-Tutu 2011). Generally, yields are lower in Ghana (360 kg/ha) than in other important producing regions like Malaysia (1800 kg/ha), and Cote d'Ivore (800 kg/ha) (Dorman et al. 2004).

Despite lower-than-average yields, producer prices paid to Ghanaian farmers are substantially higher when compared to all other West African cocoa regions (UNCTAD 2008). Research undertaken by Gilbert and Varangis in 2004 shows that within liberalized markets, growers do benefit from a greater share of retail price but obtain a lower margin in light of diminishing producer price (Gilbert and Varangis 2004). However, UNCTAD in 2008, rightly distinguishes Ghana from the greater West Africa region (based on the limited level of liberalization achieved in Ghana) and finds that Ghanaian farmers were the only group to have experienced a gradual

rise in farmer share of world cocoa average prices between 1985 and 2005 (UNCTAD 2008). Moreover, in comparison to smallholders in Cameroon, Code d'Ivoire, and Nigeria, growers in Ghana have experienced lower price volatility, which is certainly due to the relationship between the CMC and Ghanaian growers (Haruqe 2004; Gilbert and Varangis 2004). It is well worth remembering that Ghana is the only country that has retained a state marketing board and monopsony control. Regardless, in terms of a long term solutions to poverty, research indicates that cocoa has not become more profitable over time (Kolavalli and Vigneri 2011). Considering the premise of liberalization and the promise for wide-spread economic development through liberalized export marking, smallholder farmers appear to have benefited much less than expected in terms of obtaining an increased share of FOB prices.

For high value cocoa premiums, prices have similarly been trending up since they are usually pegged to FOB price. Generally, premiums are flat percentage rates of the conventional cocoa price per metric ton. For producers, organic premiums in the last few years have been between 20-25% of FOB price, which have been close to 16 USD per 50kg bag. For Fair Trade and Rainforest Alliance premiums vary due to changes in cost of certification and the amount of support given to the farmers. AgroEco, a local NGO in Ghana that manages the Rainforest Alliance program in Ghana calculated Rainforest Alliance premiums paid to individual farmers at 6.67 USD per bag (AgroEco interviews, 2011).

Market Dynamics: Demand Drivers

Over the last decade, cocoa consumption has grown by an average of 2.5% per annum (Simmons 2010) and is expected to continue rising in light of lacking supply and the rising consumer

chocolate consumption in emerging markets like China (ICCO 2010). In 2008, European chocolate sales were $31.8 billion, US sales were $16.1 billion (Datamonitor, 2009; Honda, 2009; Moran, 2008; NCA, 2009 as cited by Laderach et al. 2010).

The majority of grinding activity (a proxy for demand), occurs in Europe where over 41% of the grinding and chocolate manufacturing. Grinding peaked in 2007/2008, which was followed by a 7% drop in consumption due to the global financial crisis. (ICCO 2010). Although, demand is still below pre-crisis level, it has risen 4.8% since the crisis. Moreover, as future expectations of global economic recovery solidify, speculative movements have caused traders and hedge funds to turn to commodities futures markets, including cocoa.

Demand for fine flavor and higher quality cocoa can be approximated by evaluating the dark chocolate market which includes chocolate products that use a both a higher concentration of cocoa within chocolate products and a higher quality of cocoa. This market represents between 5% and 10% of the total cocoa market, with a higher share in Continental Europe than in the United States and the United Kingdom (Laderach et al. 2010; ICCO, 2007). For dark and specialty chocolate, cocoa content can be as high as 80%; for bulk milk chocolate, cocoa may account for as little as 12% of the final product content (Laderach et al. 2010). Higher cocoa content requires higher quality cocoa beans and roasting techniques. This includes use of Fine Flavor varieties which may be blended with basic (but still high quality) cocoa for niche consumer and industry confectionary markets (including restaurants, hotels, etc.). Research undertaken by Laderach et al. in 2010 pointed to interviews with US chocolate companies (including Guittard, Hershey, and Sharffen Berger) which confirmed a strong, upward trend in the dark chocolate and high cocoa content, category market. Data tracked by the National

Confectioners Association in 2008 showed growth of category sales in "everyday gourmet chocolate" increasing by 28% annually (NCA 2008 as cited by Laderach et al. 2010).

The Developing Market for High Value Cocoa

As a result, there exists a growing divide between a) higher-quality cocoa based on origin, variety, and production techniques which are rewarded with a market premium and b), increasingly low-quality, bulk conventional beans which garner a lower price (Barrientos et al. 2008). While the lower quality bulk market is, by far, representative of the largest share of cocoa product and sales, chocolate companies and retailers are pursuing growing niche markets that demand higher value cocoa for several reasons. One is to capitalize on a growing market and secure high quality volumes, which will be discussed in greater detail below. The second, equally interesting reason, is to halt an alarming trend of ever-diminishing quality for bulk beans. Many global chocolate manufacturers seem to believe they have strayed too far from their sources of supply—the smallholder farmers on the ground—and are actively trying to invest in capacity building towards both better productivity and quality (global chocolate company interviews, 2011). Indeed many of the same investments necessary for high value cocoa production, including investments in genetics, traceability systems, farm management techniques, farmer trainings, and cocoa processing methods, are consistent with a commitment to bolster global supply quality.

The market for high value cocoa is driven by consumer preference changes and has a strikingly different growth projection than conventional cocoa markets. Annual growth in the Fair Trade chocolate market alone grew 23% between 1996 and 2006, compared to just 2-3% growth in the conventional market (Barrientos et al. 2008). High value cocoa includes cocoa varieties that

fetch a premium in the global market place. The characteristics that embody higher value cocoa are outlined in Table 2.

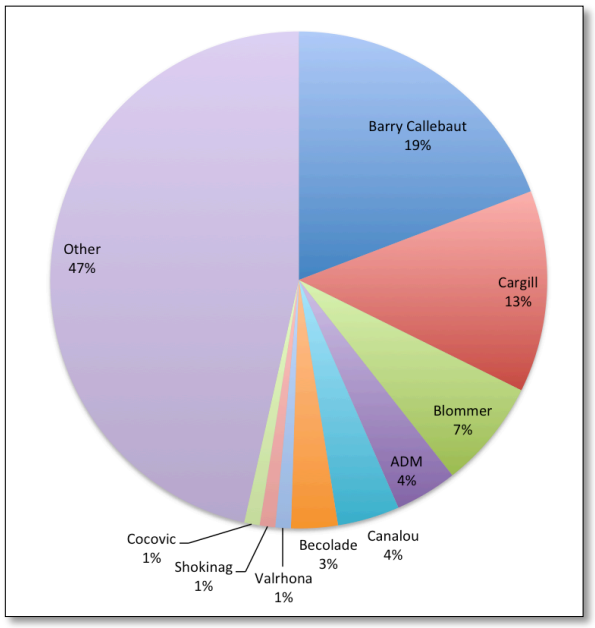
Table 2: Characteristics of high value cocoa

High-value characteristic	Meaning / Description	USD Price premium per ton* (2006)	Global Market Share	Examples
High quality *(2007 Figures)*	Product is of a superior grade.	$200-$250	17%	Many uses including dark chocolate products.
Fine flavor *(2006 Figures)*	Beans are origin and sometimes variety specific. Unique flavors are a result of climactic variation.	$ 1,769 $4,200	2-5%	Single-origin bars, specific varietal blends for confectionary or consumer products
Superior farm management practices (2007 figures)	Producers meet specific farm management criteria; e.g., excluding certain inputs or maintaining on-farm diversity.	$150-$1,000	0.5%	Certification as Organic, Rainforest Alliance, etc.
Social benefit (2007 figures)	Producers meet certain labor/process standards.	$150	0.1%	Fair Trade labeling

Source: Author's creation via Laderach et al.l 2010; Barrientos et al.l 2008; UNCTAD 2008; and 2011 industry interviews.
*Import value

Interestingly, the gourmet segment for specialty and high value cocoa is comparatively less concentrated than that for conventional cocoa, which suggests that a more competitive landscape might exist for boutique chocolate firms and independent companies (Figure 4).

Figure 4: Concentration of market share in specialty cocoa



Source: Authors adaptation from UNCTAD 2008

Fine flavor markets, however, are delicate and unique from year to year (industry interviews, 2011). Similar to the wine or coffee industry, these fine flavor varieties are often subjectively determined by experts in the industry and competition for limited production is fierce. Indefinite growth in this market is unlikely as fine flavor remains a compliment to standard cocoa for use in blends. Although certain variety types and climactic factors are well known to procurement managers and buyers, chocolate manufacturers face a challenge in educating and communicating to consumers the *reasons why* variety types, points of origin, and special blends are, in fact, artisanal, rare, and unique. Currently the International Cocoa Organization (ICCO) is organizing an Ad Hoc Panel of experts on fine flavor to assist the industry with standardizing criteria and globally recognizing qualified countries as legitimized producers of fine flavor cocoa (ICCO 2010). The ICCO's standards on fine flavor are yet to be completed. It is, however, unlikely that a formal standardization will completely diminish a free market tendency to reward new

varieties and interesting flavor profiles with premiums in open market—whether or not the producing country is on the ICCO's list as a recognized fine flavor exporter.

Concluding remarks on evolving cocoa markets

Significant opportunities and challenges exist for smallholder farmers who earn their livelihoods selling cocoa. Cocoa markets are facing extreme structural imbalances upstream in grinding, trading, and consumer retail. Vertical integration is essentially occurring backwards, with some foreign trading and processing companies essentially overtaking important export functions from government entities (UNCTAD 2008).

Evaluating farmer shares of final chocolate product price at the retail level is a poor metric for extrapolating fair wages paid at the farm level. Increasing (or decreasing) intermediary costs and volatility in prices of other necessary input commodities like milk and sugar, can distort the actual value of cocoa in a final chocolate product. In low quality milk chocolate products, cocoa may account for very little of the product composition and a correspondingly low proportion of total cost. Dark chocolate markets may give a more concrete idea of how smallholder farmers are faring as it encompasses a greater concentration and higher quality of cocoa. Shifting trends in the dark chocolate market and ever-growing high value niche markets like fine flavor, Rainforest Alliance, and organic point to new opportunities for increasing nominal prices for a farmer per 50kg bag.

Other important dimensions like country-specific demand drivers were not discussed. For instance, rising chocolate demand in China would seemingly point to new opportunities for income earning for smallholder farmers. The reality is, however, that this rapidly growing Asian

market is focused on low quality, inexpensive chocolate (ICCO interviews, 2011). This dynamic may very well 'undo' the trends to higher value cocoa in the U.S, Europe and Japan.

Cocoa markets may very well be where coffee and wine commodity markets were only a few short decades ago: which is to say, that they may mature to a high level of differentiation and sophistication on both the demand and supply side. Standardization of quality is still being sorted out and many consumers are lacking the education, knowledge, and experience in order to understand and demand a greater selection of diverse and unique chocolate products. For now, however, cocoa processors, traders, and manufacturers are busy enough trying to stabilize supply, increase productivity, and invest in the growers on the ground.

Chapter 4

Essay 1- Exploring the Risks and Benefits of Chain Participation: Farmer Perspectives

Linking farmers to markets means exposing growers to known and unknown risks, believing that they will inevitably prefer the level of risk and the benefits of the 'new' chain rather than their current opportunity (Bellemare 2011). Knowing how individuals are perceiving risks and benefits is a subjective processes that is not directly observable by program managers, researchers, or policy makers. This chapter (essay 1) explores how farmers perceive risks within the various value chains they produce for. These perceptions reflect the frequency and severity of risks previously exposed to (historical context) as well as the individual projections regarding future rewards and potential hazards. In the end we hope to have a better idea of the types of risks that farmers feel characterize their participation in a particular chain. This prepares us for a discussion in the following section that considers how value chain participants might differ in terms of risk management (risk coping) behaviors.

Value Chain Risk Profiles

Price and production risks differ between chains, giving each value chain a unique risk profile (Table 3). Regarding price risks, conventional cocoa is currently suffering from global shortages because of reduced quality, climate change, and overall low productivity in growing regions. These supply shortages can perpetuate hedging and speculation, creating volatility in a market that is already tightening due to multinational mergers and acquisitions as well as increasing product demands from developing and developed markets.

Fine Flavor markets can suffer from even more severe volatility as niche markets respond to new and fickle trends in flavor, use, and consumer preference for this 'exclusive' product. RA/org chains, while perhaps more stable than Fine Flavor markets, do not track similar prices with conventional cocoa markets (ICCO interviews 2011). Like Fine Flavor, consumer preferences for chocolate products with certain characteristics can be forsaken when economic tides turn[5]. Equally important are the risks faced on the production side, where growers must adhere to strict production rules which may require upfront investments in labor, land, inputs, and capital.

Table 3: Risk Profile of Individual Cocoa Value Chains

Chain	Description	Key Risks Faced
General (including conventional growers)	The global markets reward Ghanaian cocoa producers for the opportunity to buy quality, traceable cocoa in bulk by giving Ghanaian cocoa a 10% premium in the world market (IITA interview 2011) *Chain focus: high volume, consistent quality*	• Production shortages (climate change, pest and disease) • Demand volatility (hedging, overall market volatility) • Mergers and acquisitions and increasing supply coordination at the macro level.
Fine Flavor (FFV)	Growers are part of a joint project with AgroEco, COCOBOD, and various private sector chocolate producers attempting to install fine flavor cocoa cultivation in Ghana. *Chain focus: High value is placed on product characteristics (as defined by climatic factors and growing conditions that shape unique taste notes)*	• Demand volatility and uncertainty around market preferences for certain cocoa characteristics • Cultivation capability / breeding and disease issues • Access to credit / inputs
Rainforest Alliance/Organic (RA/org)	RA/org production started in Ntobroso and Nyinahin during 2006; first with organic, and then followed by RA production. Local farmers in either region choose to produce either RA or organic.[6] *Chain focus: High value is based on certified production practices*	• Maintaining certification requirements • Volume contracts are only secured when all farmers do their part • Specified production practices require relatively expensive inputs

Source: Author's creation, 2012

[6] As of summer 2011, premiums paid for organic remain higher than RA in Ghana (interviews with farmers, NGOs and chocolate companies; 2011)

Data and Methods

Based on the circumstances described above and after conversations and interviews with farmers, local technical assistants and NGO personnel, government staff, farmers, and research practitioners, field work pre-survey identified twelve risks within cocoa production as persistent and pervasive (Table 4). They include production risks, including crop loss, productive asset loss, post-harvest risks of decreased bean quality, and unexpected price increases in labor and inputs. Price risks included variations in premiums or bonuses, loss of certification (and thus, price premiums), 'adjusting' or cheating by buyers when farmers have their cocoa weighed for sale, and various human and social risks including household death, illness or injury, social events (costs incurred for a wedding or funeral) and divorce or separation. The survey specifically asked growers about these twelve risks, including whether or not growers faced them in the past five years, the frequency of occurrence, the level of intensity (on a scale of 1-5), and how they coped with the risk if they did experience it.

Table 4: Risk categories and specific risks surveyed

Risk Category	Specific Risk
Production Risk	• Crop losses (disease and pests) • Loss of productive asset (theft, bad weather, etc.) • Decreased bean quality due to problems with transportation, fermentation, etc. • Unexpected increase in input prices • Unexpected increase in labor cost (and unavailability)
Price Risk	• Receiving unexpectedly low premium or bonus • Cocoa was unexpectedly not certified (unfairly or otherwise) • Buyers adjust their scales and a fair price was not given
Human/social risks	• Serious illness/injury • Loss of income due to necessary social expense (e.g., funeral, wedding) • Death of household member • Divorce/separation

Source: Author's creation, 2012

Benefits and 'perks' of participating in a particular value chain were also captured. Depending on the quality demanded at the buyer level, investment in capacity (including yields and quality), variance in training, technology, technical assistance and technology transfer was explored (Table 5).

Table 5: Description of possible benefits from cocoa value chain participation

Possible benefit from participation in the value chain	Description
Technical assistance	Access to individuals who help troubleshoot problems (agronomic questions/issues), perform technical tasks like grafting, convey critical market information, etc.
Better access to inputs and technology	Actors within the value chain facilitate better/stable access to fertilizer, chemicals, seedlings or organic manure.
Lower cost for inputs (including fertilizer or inputs)	Costs for inputs may be subsidized or be offered at comparative rates (e.g., lower interest rates)
Opportunity to receive higher bonus/premium because of elevated quality	Some combination of higher value market access, technical assistance (supporting higher quality product) and better access to inputs and credit supports higher productivity and profitability per unit.
Access to financial or in-kind credit	Growers receive some kind of access to credit as part of being a value chain member.

Source: Author's creation, 2012

Descriptive Results

Descriptive results give the first insights into the three chain groups (Table 6). Perhaps surprisingly, initial means testing amongst these variables suggests that there are few differences among them. No significant difference is found between land size or education amongst these groups. Statistically significant age differences do exist between groups but they are relatively close (within 10 years) when considering the human lifecycle. FFV growers are cultivating significantly smaller cocoa plots, but this is to be expected since these growers are restricted in

their production due to rationing of FFV materials (cocoa seedlings) due to the pilot phase. FFV growers do, as mentioned, grow conventional varieties of cocoa, but it appears that they do not have exceptionally larger holdings than their purely conventional or RA/org counterparts.

Table 6: Descriptive results

		GrowerVC					
		Conventional grower		RA/org grower		FFV grower	
		Column N %	Mean	Column N %	Mean	Column N %	Mean
Gender	Male	79.8%		67.2%		63.6%	
	Female	20.2%		32.8%		36.4%	
Respondent age			52		50*		57.5*
Education			3		3		3
Years cocoa farming			18		17		21
Household total			8		9		10
Total farm acres			12.8		10.7		9.9
Total_Cocoa			11.25		9.10		7.52
Ave. Cocoa Yield Per hectare			1.72		2.19		1.52
Total KGs harvested			16.55		14.41		9.69
Crop failure CO bags lost			.59		.70		.54
Cost compare	Much higher	29.8*%		19.0%		19.0%	
	Higher	22.0%		34.5%		9.5%	
	Almost or exactly	23.2%		24.1%		19.0%	
	Lower	17.1%		13.8%		28.6%	
	Much lower	8.5%		8.6%		23.8%	
Specif. Prod. Cost	Fertilizer	7.1%		4.7%		4.5%	
	Agrochemicals	15.5%		12.5%		9.1%	
	Paid labor	75.0%		79.7%		86.4%	
	Post-harvest	1.2%		1.6%		.0%	
	Seedlings	1.2%		.0%		.0%	
	other	.0%		1.6%		.0%	

**Significantly different at .15 levels*
N= 177
Note: Education was divided into highest level achieved (may or may not have completed) with 1=primary school, 2=junior high school, and 3=senior high school. Additionally, tree maturity for grower groups are different, leading to differences in average yields. Conventional growers and RA/org growers tended to have trees that were between 8-15 years, while FFV growers had trees just reaching maturity with grafted rootstocks.

What is interesting is that despite the differences in on-farm production practices, the groups are statistically similar with regard to on farm productivity. In particular, the differences between RA/org and conventional provide interesting insights into the assumptions often made about

third-party certification and the assumed dependency one must have on chemical inputs for competitive yields. Ghana's cocoa production is characterized by small-scale farming with low average yields that pale in comparison to the full-sun cocoa yields which are substantially higher within neighboring producing countries like the Ivory Coast (Afari-Sefa et al 2010). Compared to average productivity in Ghana, similar yields between RA/org farmers and conventional growers show that the RA producers can keep pace with their input-dependent conventional counterparts. RA growers grow cocoa in an agroforestry system, with specified shade and biodiversity requirements (for example, a density of 70 trees per hectare are necessary for shade-certification) (Afari-Sefa et al., 2010). Afari-Sefa et al. (2010) put forth evidence that shade-centric systems—similar to Rainforest Alliance—can represent between a 30-50% decline in yields when compared to full sun, conventional systems[7]. In contrast, evidence from Ruf and Zadi (1998), Laderach (2011), and Issac (2007) suggest that shade-grown systems and those with on-farm biodiversity requirements are often better equipped to deal with bioclimatic changes and disease and further creating better soil conditions for nutrient cycling and uptake, all of which generating greater input and labor efficiency[8]. The evidence here corroborates the systems-thinking in the latter research and provides empirical evidence that an agro-forestry approach can compete on yields with conventional varieties in Ghana.

Yet evidence showing that RA/org growers are competing in terms of productivity does not necessarily silence concerns about elevated production costs. Indeed, critiques of third-party certification often point to higher costs of inputs and overall production at the farm level (Getz

[7] Full sun production systems, however, can support trees to reach extremely high yields but only for a short period of time; with high yields sustained only by adding increasing amounts of chemical fertilizer, insecticides, herbicides, and fungicides beyond trees aged 10-12 (Franzen and Mulder 2007).

[8] Growers reported crop losses of between .54-.70 bags per acre: the differences are not significant between groups and the losses are largely due to swollen shoot virus and black pod (Interviews with farmers and AgroEco, 2011; Afari-Sefa et al. 2010.

and Shreck 2006). Compared to the national average of 922.50 cedi per acre[9], growers were asked if their production costs were much higher, higher, almost or exactly, lower or much lower. Almost 30% of conventional growers, on average, reported that their costs of production were much higher than this figure, compared to only 19% RA/org growers and FFV growers who stated the same[10]. RA/org growers appear to hover around the national mean, with more than 50% stating that their costs are almost exactly or (somewhat) higher. The majority of FFV growers state that their production costs are either lower or much lower than the national average, which is in line with the fact that the program is being partially subsidized during the current pilot phase.

Perceived Risks

The survey instrument attempted to capture the perceptions of risks and benefits of growers in different value chains as well as the methods of risk coping (see Appendix, Survey Instrument, section D). Regarding expectations for prices, growers perceived very different levels of price variation (Table 7). RA growers indicated the least amount of variability, supporting findings (much of which are described later in this section) that growers have trust in the RA market to consistently deliver stable premiums. For conventional growers, results indicated that farmers expected prices to continue rising. Most conventional growers believed that the lowest possible price was the prior years price, with moderate increases in price expectations for the future. FFV growers estimated a price boom – to over quadruple the highest perceived conventional price and to more than double the highest RA/org price. Even the lowest price expected by FFV was

[9] Official statistic collected from in-person interviews in 2011 with Cocoa Research Institute of Ghana.
[10] Means testing between the populations for this question showed a significance between RA/org and conventional and high value chains at .10 levels.

estimated to be more than five times higher than the lowest price perceived by conventional growers. When compared to the lowest price perceived by RA/org growers, FFV growers felt their lowest price would be 300% higher. The significance of these results are confirmed with a one-way ANOVA analysis and post hoc comparisons (Tukey HSD) indicate that these means are significantly different at .01 .

Table 7: Price expectations

Value chain	Mean High Expectation *(Units: Ghana Cedi / KG)*	Standard Dev.	Mean Low Expectation *Units: Ghana Cedi / KG)*	Standard Dev.
FFV	.62	.69	.27	.51
RA	.29	**.16**	.09	.12
Conv.	.14	.22	.05	.09

Risk ranking amongst the three value chains pointed to some interesting conclusions about grower trust as well as concerns about participating in cocoa markets (Table 8). The same handful of risks appear in each grower category, suggesting that across chains, important risks are faced regardless of chain participation. There are two important things to note, however. First, cheating at the weighing scales is a pervasive issue despite the value chain that one participates in. That said, while RA/ org growers experience this, they experience it rarely, indicating that when it does happen, it is severe but not as severe as other possible risks. Multivariate regression analysis later confirms that RA/org growers are at a reduced level of relative risk when it comes to cheating at the scales. It would seem that a 'spillover' benefit of having more participation in the growing and harvest process by field officers and technical assistants provides greater transparency and yield documentation which translates to higher

accountability for purchasing clerks and less ambiguity for farmers.

Table 8: Risk ranking amongst VC growers

Risk-type Perceived	**Conventional growers**	**Rainforest Alliance growers**	**Fine Flavor growers**
Most 'severe' risks faced	1. PC cheating 2. Labor costs (tie) 2. Crop loss (tie)	1. Crop loss (tie) 1. Labor costs (tie) 2. PC cheating	1. Labor costs 2. Input prices (tie) 2. PC cheating (tie)
Most 'frequent' risks faced	1.Crop loss 2. Low premium/prices 3. Labor costs	1. Crop loss 2. Labor costs 3. Input prices	1. Crop loss 2. Low premiums/ prices 3. PC cheating

Secondly, RA growers express particular exposure to production risks. This is somewhat unsurprising since improved production standards are explicit and can be restrictive when compared to conventional production. However, RA/org growers seem to indicate that they face particularly low chances for receiving an unexpectedly low premium or bonus, highlighting grower confidence in the RA/org system.

Declared Benefits

Value chains for development literature and the 'inclusive markets' literature focuses much on the ability to use a value chain approach to funnel investment from higher up on the supply chain down to participating growing communities (Hebebrand 2011; Humphrey 2005; Reardon and Timmer 2007; Hawkes and Ruel 2011). This includes investments in productivity, which can occur when growers receive training, technology transfers, and access to credit. In order estimate if (and how) these benefits were accruing to farmers, growers were asked if they received these benefits and how important the benefits were to them if they received them (Table 9).

Table 9: Description of benefits of cocoa production

Chain benefit	Description	Conv.	RA/org	FFV
1. Technical assistance	Agronomic and technical support, convey critical market information, etc.	71% receive this. It is cited as "important[11]"	80% receive this. Growers cite it as "very important"	90% receive this. Growers cite it as "important"
2.Better access to farm inputs and technology	Facilitate better/stable access to fertilizer, chemicals, seedlings or organic manure.	50% receive this. It is cited as "important"	50% receive this. It is cited as "very important"	90% receive this. It is cited as "important"
3. Lower cost for inputs (fertilizer, manure).	Costs for inputs may be subsidized or be offered with low interest rates	25% receive this. It is cited as "important"	43% receive this. It is cited as "very important"	18% receive this. It is cited as "not very important"
4. Opportunity to receive higher bonus or premium because of elevated quality	Some combination of higher value market access, technical assistance (supporting higher quality product) and better access to inputs and credit supports higher productivity and profitability per unit.	87% receive this. It is cited as "important"	88% receive this. It is cited as "very important"	54% receive this. It is cited as "very important"
5. Access to financial or in-kind credit	Growers receive some kind of access to credit as part of being a value chain member.	44% receive this. This is cited as "important"	26% receive this. This is cited as "important"	27% receive this. This is cited as "very important"

Regardless of the value chain, most cocoa growers believe they are getting important services that are benefiting their production, improving their prices, and providing access to higher profits. Specifically, this includes access to technical assistance, better inputs to technology, and the opportunity to receive higher bonuses because of improved quality. A high response (90%)

[11]Growers who indicated that they did receive this benefit were then asked how important that benefit was to their production on a scale of 1-10. Answers were then clustered 1-4= not very important, 5-7= important, and 8-10= very important. Growers who did not receive this benefit were not asked about importance of the benefit. Mean responses for the 'scale of importance' are reported in Table 5.

for ‘better access to technology’ for FFV growers accurately indicates that growers are benefiting from free seedlings, grafting services, and other inputs provided by the FFV program but not widely experienced in RA/org or conventional VCs. A lackluster response by FFV growers benefiting from higher premiums is likely reflective of the infancy of the FFV project as growers have yet to experience the full harvest season and payment period.

Benefits of access to low-cost fertilizer and other inputs portrayed a stark divide. FFV growers did generally not experience this benefit (only 18% did) and FFV growers responded that it was relatively unimportant for them to obtain. In contrast, access to low cost fertilizer and other inputs was experienced by 43% of RA/org growers but was rated as ‘very important.’ Most growers pointed to specific inputs like manure and a few others that were approved for RA/org certification.

All groups cited credit access as important benefit, with FFV growers citing it as ‘very important.’ Access to finance is explored in depth in the following section but it is important to note here that just because growers say they do not find credit as a benefit of their supply chain participation does not mean that they are necessarily credit constrained. As we explore in the following section on financial tools, growers may have different avenues of credit access available to them beyond the credit available to them by actors and institutions that support them in cocoa production. This brings up a larger problem, namely that complex partnerships established around supporting growers in different chain opportunities is often blurring the perception of growers (and researchers alike) in understanding what is part of the ‘value chain’ and what is part of a wider ecosystem of agricultural extension and rural development. We turn

next to what organizations and institutions growers feel enable them to increase productivity, quality, and overall income in cocoa cultivation.

Benefit exclusivity and benefit providers

Growers were asked if they felt that this benefit was available others (for example, neighbors or friends) who did not participate in the same value chain (e.g., neighbors who were not RA/org growers or FFV, or friends who did not sell cocoa into conventional value chains). With two big exceptions, farmers felt that most of the benefits they experienced as a member of their chain could be accessed through other sources. The first exception is technical assistance. 70% of RA/org growers felt that technical assistance was exclusive to the value chain that they were participating in, compared to 63.3% of FFV growers and only 48% of conventional growers[12]. Second, differences between grower groups were found in perceptions of exclusivity for benefits arising from lower input cost. This time, FFV growers were much more likely to disagree that lower costs of inputs were exclusive to their value chain, which is somewhat surprising since the FFV pilot is, at the moment, quite limited in terms of participants[13].

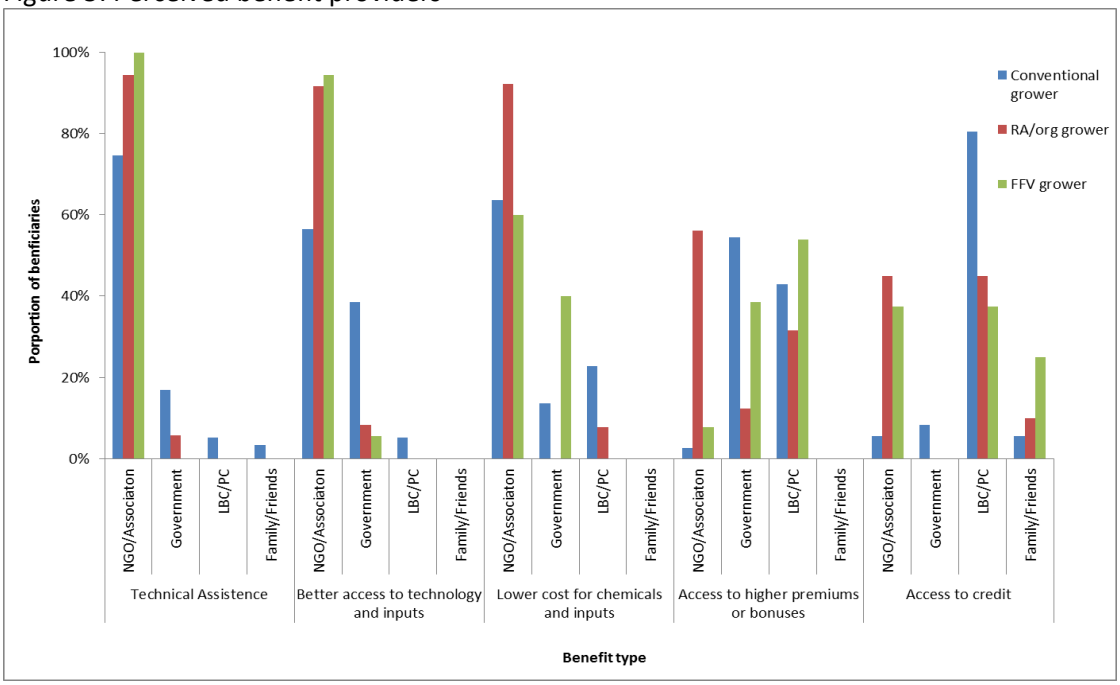
While complex partnerships can combine to create new tools and opportunities for farmers to reach new markets, the inability to associate benefits with certain chain actors, institutions, or organization could potentially undermine farmer-loyalty and reduce incentives for investment. At the moment, this is likely less true for high-value cocoa growing communities that have sanctioned buyers. However, third party certification as the 'norm' is continuing (Barrientos et al. 2008). Conventional Ghanaian cocoa farmers in a 2004 COCOBOD study suggested that

[12] Difference between means is significant with p= .01
[13] Differences between means is significant with p= .07

farmers are not 'captive' clients to the PC's (or by extension, the LBC's) but that they are likely to add or drop buyers over a given season (Teal et al. 2006). With current and looming supply shortages, competition between LBCs and international buyers have an incentive to retain farmers (or steal them away) and increase supply chain productivity. When farmers don't make clear connections between the value chain and the providers of beneficial services, costly investments might 'dissipate' into the larger Ghana cocoa market, reducing business engagement and development opportunities. An opportunity for creating loyalty through 'branded' service provision (aside from fixed monetary incentives in the form premiums) is an area for further research. As more and more cocoa and chocolate manufacturing companies move towards third party certification, linking services to value chains will grow in importance.

Moreover, understanding farmer satisfaction and identification of service providers can give a better sense of where development dollars might be best spent and which corresponding organizations are critical smallholder success. Major entities that support cocoa production, regardless of the particular value chain, include AgroEco, the government (e.g, COCOBOD and associated bodies) the local purchasing clerk (PC), and broadly, the local community (friends and family). AgroEco is present in all areas surveyed and the organization has been foundational in creating and assisting 'associations' or communities. As such, the category for 'NGO' is combined with the category for 'association' in the following results, since differentiating between the two was confusing, if not impossible, for many respondents. Respondents were asked first if they received theses services (see above Table 9), and if so, who they felt was responsible for the service provision (Figure 5).

Figure 5: Perceived benefit providers



The importance of AgroEco and the associations they support in these communities cannot be understated. They are a foundational part of each value chain for training and technical assistance, as well as access to technology, lower cost for chemicals and inputs, and to a lesser extent, credit. Access to higher premiums as a result of NGO assistance was overwhelmingly acknowledged by RA/org growers but less so from the other two value chains. Again, with FFV growers, low response rates are perhaps expected as they have yet to see the full benefits (e.g, high premiums) due to the maturity of the program.

With regard to access to credit, more diversified options appear to exist for growers in high value chains, including options from family and friends as well as from the purchasing clerk (PC) who is often attached to a particular licensed buying company (LBC). A relatively even split between perceptions of credit access from the LBC/PC and NGO/Association may be due to grower confusion about who actually offers the credit. One could argue that growers may be

unclear on whether it is the NGO who helped found the RA/org or FFV program in the community, or if it is the sanctioned buyer (LBC/PC) who actually extends the credit. Regardless, the important relationship between the LBC/PC and liquidity within the community is clear. This relationship, along with a broader analysis on access to credit and finance, is explored in depth in the following essay (essay 2).

Two other trends are important to point out in order to understand how growers perceive benefits and to whom they credit for these benefits. First, conventional growers seem more likely than other value chains to credit the government with benefit provision. An exception occurs in 'low cost for inputs' where FFV growers credit the government, perhaps because they realize they are currently benefitting from plant breeding and fine flavor genetics research undertaken by CRIG (a government entity). The absence of government recognition across benefit categories is perhaps understandable for RA/org growers since this group is unable to benefit from government spraying programs because of the input restrictions outlined in RA/org certification.

Another important trend occurs within the category for 'access to higher premiums or bonuses.' In this benefit category growers are fractured within their respective value chains. This suggests that growers may likely find all these organizations and institutions helpful in the production process, or that they are confused by the relationship between all these organizations. The reality is that for conventional, RA/org and FFV members, the government, NGOs, and the LBCs are intertwined, creating an 'ecosystem' that provides different market opportunities, premiums and bonuses.

Conclusion: Smallholder Perceptions of Risks and Benefits Across Cocoa Chains

A handful of interesting insights amongst growers in three different cocoa markets have been explored. The first is that producers face 'systemic risks' in cocoa production in Ghana, including crop disease and rising labor costs, which cannot be easily addressed by solely prioritizing one type of value chain versus another. However, high-value chains seem to be managing some of these systemic risks (for example, increasing costs of labor and other inputs) through partnerships with NGOs and associations that provide them with important services. Conventional growers and, to a lesser extent, FFV growers, seem more ready to credit the government for help addressing cocoa production risks than RA/org growers. As the cocoa industry moves towards third party certification, linking services to the value chain and retaining growers through 'benefit branding' will grow in importance.

Understanding perceptions of risks and benefits amongst the three value chain groups does provide interesting benefits into how growers are thinking about their opportunities, the level of risk they are willing to take, and the expectations they have for success. FFV growers expect a lot from their value chain. Specifically, they perceive a price increase of over 400% per KG when compared to baseline conventional estimates. It is important to remember that even if farmers do find such high-income opportunities in FFV, dependency on niche markets value markets should be a legitimate concern for development policy makers and practitioners. Niche markets, like FFV, are not scalable economic development initiative region-wide because there is not a matching scale of demand for the increase in supply (Interviews with Hershey, 2011).

Growers within the three chains all acknowledge systemic risks, but RA/org growers rank production-related risks relatively higher than any other VC group (in terms of severity and

frequency). This is not to say these risks are objectively higher, but rather that RA/org subjectively assesses them to be higher. FFV growers like conventional growers, rank a mix of production and price related risks, including transparency related issues related to PC cheating and low premiums/bonuses. RA/org growers suffer from cheating, but the frequency appears to be less and the RA 'system' lends itself to increasing supply chain transparency by closely linking growers, technical assistants, and buyers (PCs).

In this study, RA/org farming systems seem to be addressing the 'yield risk' of the agroforestry system quite well; cultivating competitive yields when compared to conventional or FFV growers. Descriptive results show little differences between these three groups with a lack of meaningful difference between grower groups with regard to variables like stated income, household size, and farm holdings.

Competitive yields between RA/org and conventional growers do not appear to come with increased RA/org production costs. When asked about comparing per acre costs with the conventional national average, RA/org growers stated that their costs were marginally higher or about equal to the national average, whereas the majority of conventional growers stated that their costs were significantly higher. This shows that for the members surveyed, high value chains focused on production practices can be competitive in terms of yields and production practices, despite the persistence of many critics who claim the opposite.

Across value chains smallholder growers benefit from a supportive ecosystem that brings services and assistance. These providers include the government, local NGOs, PCs, and to a lesser extent, friends, family and others in the community. Objectively, it seems that high-value

growers are more dependent on the local NGO for service provision, with conventional growers more likely to credit the government for service provision. This is, at least in part, due to the governance and coordination of products established by of the value chain itself (or rather, the retailers and grinders downstream who tend to drive standardization upstream). For example, RA/org growers do not benefit from government spray programs that lower production costs and reduce disease outbreaks because of RA certification regulations. Lastly, it seems that the PC/LBC plays a special role in service provision, most importantly, access to a high premium and access to credit. Whether or not growers associate PC credit extension with higher premiums and bonuses is outside of the scope of this study, however, it is clear that PC credit is an important access point for credit in cocoa communities. This prompts important questions including how much of this credit is lent out over a given year and how much of it goes into on-farm investment. Interviews with Purchasing Clerks and farmers were mixed on this front. What is clear, however, is that conventional and high value chains have different drivers, different market opportunities, and thus, different supportive entities edging them towards success. Value chain initiatives focused on specific market opportunities need to be clear about the organizations and individuals that are required for involvement and understand what farmers believe are both severe and frequent risks in order to reduce barriers to participation and address grower needs.

Chapter 5

Essay 2- How do value chain participants manage risk? Do Shared Risk Management Options Characterize Smallholders in Cocoa Value Chains?

Analyzing value chain projects that attempt to link the rural poor to more remunerative opportunities requires delving into a large and longstanding literature on risk and decision-making. Day-to-day life presents a host of unexpected fluctuations that must be dealt with, in one way or another (Fafchamps, 2003; Blakie et al. 2003). It is not that the poor do not have resources to put towards risk management—numerous empirical studies have shown that they do (Dercon 2000; Morduch 1994; Fafchamps 2003). It is, rather, a question of what tools and priorities the poor choose and what impact those strategies might have on important welfare objectives as all risk management options are costly and require tradeoffs. While the previous section considered how farmers in different value chains perceived different risks and benefits of participation, this section considers if these perceptions mobilize different risk management approaches and if those approaches characterize growers in particular value chains.

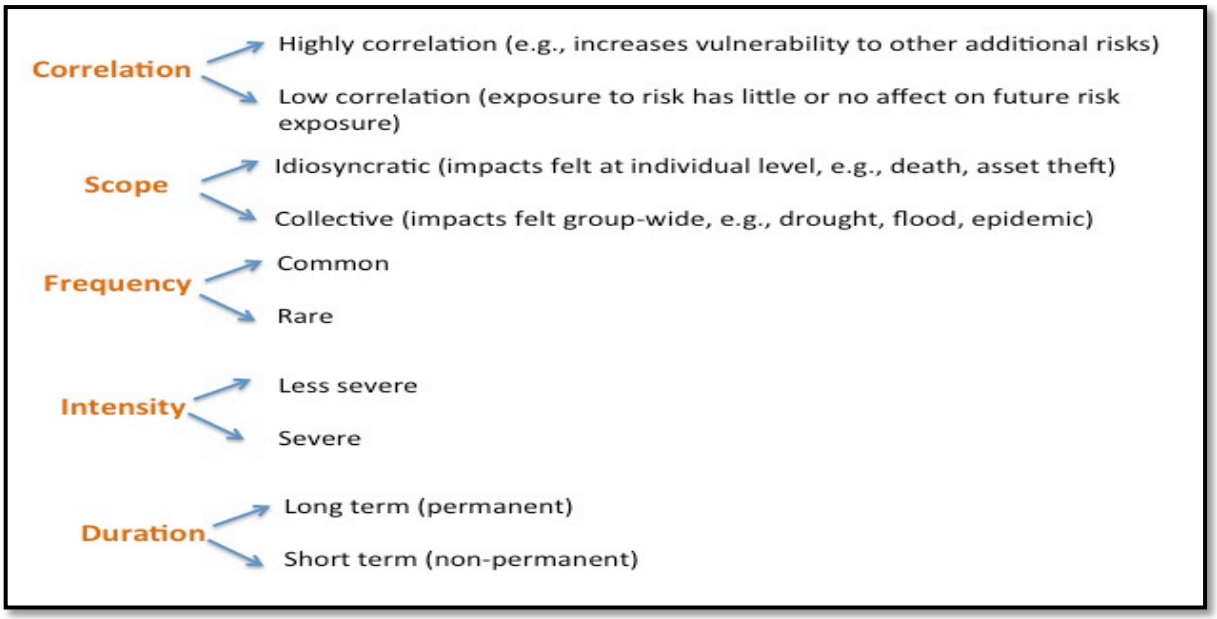
Often, a value-chain approach to development suggest that smallholder integration into value chains can allow for better risk sharing, income distribution, information sharing, and technology transfer: essentially, that risks are minimized and benefits maximized. Does value chain participation really create a better environment for efficient risk management? Or, is cash-flow risk managed similarly regardless of the chain one participates in? This section begins with a review on risk management for the rural poor, proceeds to a short discussion on relevant methods

and data analysis, continues on to a discussion of results, and ends with a short conclusion that summarizes key findings.

Defining Risk

Shocks occur with varying intensity, frequency, and individual impact. Deconstructing risk into its various attributes allows us to understand *what* is at risk, *why*, and for *how long*. For example, an intense risk (like a death or sudden injury) may occur rarely but permanently decrease future earnings. Another risk may be frequent but less severe, and have a slow, long-term effect on real income. Here, what is at risk is *income*, which is used as a proxy for general household wellbeing[14]. After reviewing the literature on risk management in the smallholder context, the components of risk are broken down in Figure 6.

Figure 6: Components of risk



Source: Author's adaption (2011) from Fafchamps (2003)

[14] Household income as a proxy for household welfare suggests that intra-household allocation of money and resources are equitable between household members. This assumption, perhaps more often than not, is likely untrue. It is, however, regrettably out of the scope of this research.

Correlation: Risks that have high levels of correlation have an important, "linking" characteristic that increases vulnerability to other potential risks. For example, a farming household that experiences a severe crop loss may then undergo a period of malnutrition because of reduced spending on food. Malnutrition may increase vulnerability to other diseases and reduce health further in the future. This may reduce on-farm productivity and income earning potential, creating a vicious cycle. Certainly there is a difference between exposure to a risk that increases vulnerability and decreases capability for securing future welfare, versus one that is statically unpleasant.

Scope: Idiosyncratic risks relate to shocks faced by specific individuals, like isolated instances of injury or illness, theft, or even death (Fafchamps 2003). Collective risk refers to risks that are experienced by a collective group, where exposure can be easily transferred between individuals based on shared characteristics like cultivation method or crop, gender, ethnicity, income level, country, etc. Certainly it's difficult to judge at what point an idiosyncratic risk (like contracting a disease) turns into a collective risk (like an epidemic), so it is worth mentioning that the categories can be time-bound, with risks become generalized and spread across time and space.

Frequency and Duration: Risk is a process that unfolds over time (Fafchamps 2003). Cocoa growers in Ghana may frequently experience unscrupulous buyers who manipulate the scales and cheat them out of their proper cocoa payment. On rare occasions growers may experience theft on their home or farm. The duration of impact, for both of these events, may be significantly different. Theft of productive assets, for example tools or chemical inputs, may have a longstanding impact on yields and reduction of potential income. Manipulated scales, however,

might cheat farmers out of a few kilograms of product, but the impact is often relatively short lived. Here, frequency and duration are closely linked.

Intensity: Intensity levels may be either objectively or subjectively measured and may be different amongst individuals and groups. Intensity levels denote the severity of a negative outcome, which may be felt all at once, or spread out over time (i.e., permanent or non-permanent in duration, or highly correlated with future vulnerability). Sudden, intense shocks, like natural disasters or human conflict, may require immediate protection, services, and support. Exposure to other risks, however, may demand less emergency attention but have a greater long-term impact. Disproportionately low educational investment in young girls, for example, may have long-term impacts on the nutritional health of her future family, diminish her lifetime earning potential, and reduce her chances (and her children's chances) of escaping poverty. While emergencies should continue to be addressed, weighting the immediacy of pain to intensity of exposure can downplay the tragedy of a persistently reducing shock that compounds over time.

Defining Income Risk and Risk Management Options for the Rural Poor

Some risks are common and predictable; others are haphazard and affect us for the rest of our lives. Bad versus good outcomes can only be evaluated and compared when the decision makers' ability to tolerate (or prefer) one outcome versus another is known (Anderson & Hardaker, 1977). For a poor smallholder, a risky decision about production or investment in the farm requires the farmer to consider,

- *Subjective probability*: the probability he or she associates with the preferable (good) outcome.
- *Severity*: the degree to which the bad or good outcome would affect his or her household now and in the future.
- *Tradeoffs*: associated tradeoffs and impacts for other important spending and consumption categories when juxtaposed against the cost of risk management.

Regarding cash flows, agricultural enterprises suffer from two main sources of cash flow risk – financial and business risk. Business risk refers to the inherent risks involved in agriculture; independent of the way operations are financed (Gabriel and Baker 1980). Inherent businesses risks include volatile climatic and weather patterns, in addition to price, economic, and human/social risks. Farming also suffers from high levels of correlated risk, meaning that individuals who farm in a given area are generally subject to the same weather, policies and economic conditions and tend to suffer as a collective. Many insurance and credit agencies cite the "systemic" nature of business risk in agriculture as a key deterrent to lending and insuring.

Financial risk refers to the added variability of cash flows to cover debt and financing costs a farm might undertake to expand production, finance a tool or asset, or access and invest in a new market opportunity. Cash flows must be deemed sufficient to pay creditors and retain credit worthiness. The more debt a business owes, the more likely it is to default on financial obligations. Leverage from debt is often critical to raising productivity through investment in new technology, adequate inputs, and information access[15]. Between these two risks a careful

[15] Leverage through equity is not discussed as it is not a viable financing operation for smallholder farmers in the developing world.

balance must be pursued; an equilibrium which farmers, large and small, find enormously challenging.

In the U.S and other developed economies, availability of formal credit and insurance allows growers to smooth income in light of volatile shifts in price or production, allowing them to assume a particular level of risk without compromising immediate household consumption in the event of a shock. Throughout the developing world and within low-income economies, the availability of credit and insurance is often characterized as missing, weak, or inefficient (Morduch 1991; 1994; Banarjee and Duflo 2007; Carter and Olinto 2003). As a result, farmers must cope with risk through alternative means, namely by making conservative production or employment choices, diversifying income opportunities, or tapping any available informal financial resources.

On the other end of the spectrum are tools for reducing consumption, which epitomize the difficult decisions that come with being poor and vulnerable. Consumption smoothing includes reductions in food spending, health and healthcare spending, on-farm investment, the likes of which may have significant impacts on health, education, and future productivity and welfare. Broadly, the tools used to smooth consumption and income in light of negative cash flows can be described by function; including financial tools, production decisions, and resource allocations (Table 10).

Table 10: Strategies for Managing Income Risk

Strategy described	**Behavior (What it looks like)**	**Drawbacks**
	FINANCIAL TOOLS	
Savings Insurance Loan taking (formal) Loan taking (informal) Loan taking (buyer-driven credit)	-Incremental savings from earnings (off farm income and on-farm income). -Micro-insurance or insurance products. -Loans through banks, moneylenders, microcredit agencies (formal). -Loans through friends, family, neighbors (informal). -Loans through buyers (local purchasers of product, processors, traders).	Geographic isolation or structural deprivations (like literacy, gender, lack of social connectivity or poverty) may reduce access (Vanderpuye-Orgle and Barrett 2009). Desperate borrowers may choose to borrow regardless of terms or conditions.
	PRODUCTION DECISIONS	
Diversify across multiple activities (in labor or on-farm) Conservative production choices	-Diversify income across multiple crops (on-farm diversification). -Diversify income across multiple activities (labor diversification). -Enter into contract farming (for income security) even if it means lower average income (Michelson, 2010).	Significant loss of productivity as a result of inefficient input use (Morduch, 1994; Bliss and Stern, 1982) Diversifying into more profitable activities can be characterized by entry constraints (Dercon 1997) Lower productivity (income) is sacrificed for reducing the potential for future variability in earnings.
	RESOURCE ALLOCATIONS	
Buy (sell) a productive asset Reduce household consumption	-Buy a productive asset to increase productivity (machinery, animals, land, etc.) -Tie up cash in an asset (as precautionary savings), and sell if circumstances demand. -Restrain household spending in any number of categories or for specific individuals.	Short-term surge in cash to pay for immediate needs. In the long term, this can contribute to a permanent or near permanent fall in income (e.g., asset-based poverty traps). Lower nutrition intake, pull children out of school, reduce spending on health. Short term flexibility for income variation, long term impacts on productivity and welfare (e.g., nutrition or health poverty traps).

Source: Author's creation 2012

Exactly which strategies poor households favor is important in understanding the implicit cost that poor people pay in the long and short term to manage risk. Cash flow, comprised of income inflow (a source of cash) and consumption outflow (a use of cash), must be equalized as they represent and the household budget identity. Sources of cash include from-farm income, off-farm wage labor, transfer payments, asset sale (liquidating assets), and borrowing (formal or informal loan taking). Uses of cash include on-farm investment and important household consumption categories like education, health, and food spending. As an identity, Table 1 can thus be put in equation form. With savings (at time zero), S_t, on the left side of the equation, we provide a household budget equation that represents the options many households have to manage risk. As an objective function by which household manage risk, the household budget equation we consider includes, R, informal borrowing, B_i, formal borrowing, B_f, asset sale, A_s, on-farm investment (asset purchase) A_p, and three important consumption categories; food spending, C_f, education spending, C_e and health spending, C_h. The equation is thus:

$$S_t = (R - C) + W + B_{f,} + B_i - P_{t-1} - \left(C_f + C_e + C_h\right) + A_s - A_p$$

Where C is equal to production costs and P_{t-1} is equal to any payments on previous loans. Using the categories outlined in Table 9, each of these variables can be assigned a category. How these variables are manipulated in household approaches to risk management can then be assessed. For the remainder of the analysis in this section, this equation represents the framework by which we understand the weighting of risk management strategies of farmers and groups analyzed.

Data and Methods

Understanding how growers were coping with risk as members of their respective chains was a central part of the 2011 cocoa value chains survey. Growers from the three chains were surveyed about the risks they faced in their respective value chains and the methods by which they managed those risks (see Tables 3 and 4 in essay 1). As mentioned, conversations and interviews with farmers, local technical assistants and NGO personnel, government staff, and research practitioners illuminated these twelve risks as being persistent and pervasive amongst cocoa producers in Ghana. The survey asked growers if growers faced these price, production and human/social risks in the past five years, the frequency of occurrence, the level of experienced intensity (on a scale of 1-5), and how they coped with the risk if they did experience it. Human and social risks were often exogenous to the risks posed by value chain participation, but the exposure and management of these risks were often helpful in contextualizing vulnerability levels and understanding how these risks might contribute to financial stress, productivity levels, and on-farm investment decisions.

For those that work with rural poor, deconstructing risk into its various attributes allows for better questions about priorities and efficient policy or program mobilization. For example, an objectively intense risk may occur rarely, but rapidly, and permanently decrease future earnings. Another risk may be frequent but less severe, and have a slow, long-term effect on real income. Understanding how risks unravel over time and space can give development practitioners, donors and policy makers offers an opportunity to determine organizational preferences and priorities on how, where, and when to intervene. The collection of this data is a first step in understanding the temporal nature of risk management but it is limited in its ability make these kinds of

assessments. This is a snap shot, cross-sectional data set stating beliefs and preferences of farmers but does not consider how these beliefs or preferences change over time, as the initial shock fades, or how past shocks or risk management choices bias current attitudes and behaviors.

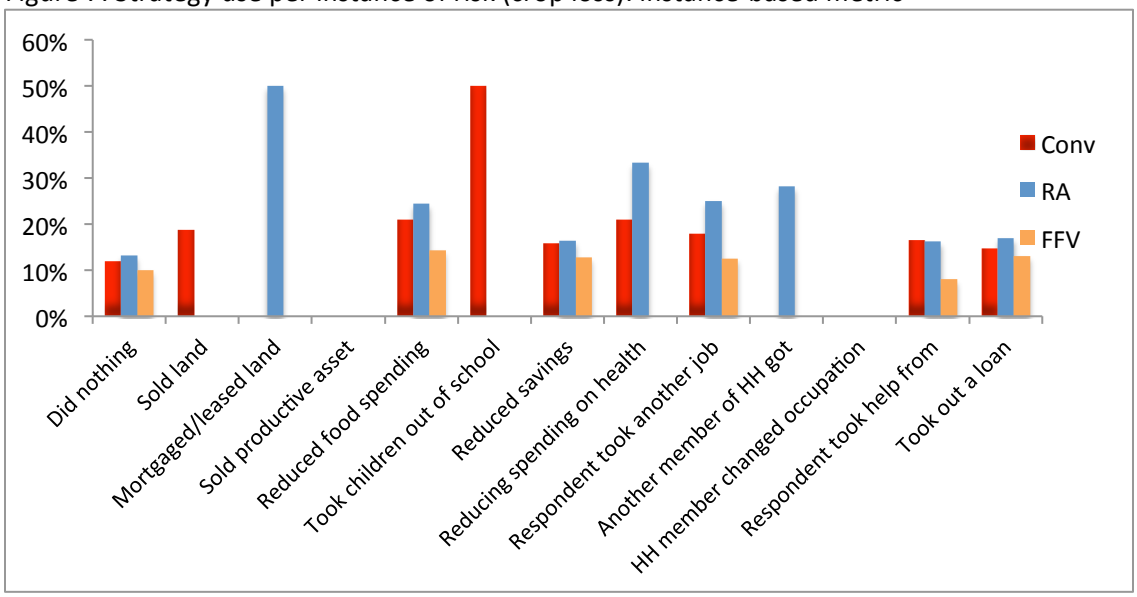
For this survey, risk coping strategies were broadly categorized into financial tools, production decisions, and resource allocations, as indicated by a review of the literature summarized in Table 10. When a grower indicated he or she experienced a particular shock, they were presented with a list of 13 possible risk coping strategies and asked to identify a maximum of three, minimum of two, coping strategies (Figure 7). This listing was based on a review of relevant current empirical research (including Dercon 2000; Fafchamps 2003; Kochar 1999; Morduch 1991, 1995; Kazianga and Udry 2006; Barrett et al. 2001). Financial tools included access to formal loans, including banks, credit agencies, local cocoa purchasing clerks (PC's) and moneylenders. These entities differed in their use of contacts and collateral as well as the amount of interest charged. For example, purchasing clerks tended not to charge interest in monthly intervals or at a set rate, but rather took cocoa as payment at harvest time. If debts were not paid at harvest (or before), the borrower would pay double – both the payment owned plus a 100% 'fine' (field interviews, 2011). Banks and moneylenders charged between 20-36% interest. Coping strategies within the production decisions category included changes in respondent workload as well as within the household. The options included the respondent taking on an additional job (or increasing workload), having a member of the household get another (or a new) job, or having a household member change their occupation to earn more. Finally, growers were asked about shifts in resource allocations, including important household

consumption categories like health, food, and education. Specifically. These included the selling of assets (equipment, animals, tools, etc.), mortgaging and leasing of land, and the sale of land.

Instance-use Versus Population Use

An important methodological note must be made before continuing. Coping strategies can be compared by use per-risk (e.g., prevalence of coping strategy use considering the risk being managed) or popularity of strategy within the group surveyed (Figure 7).

Figure 7: Strategy use per instance of risk (crop loss): instance-based metric

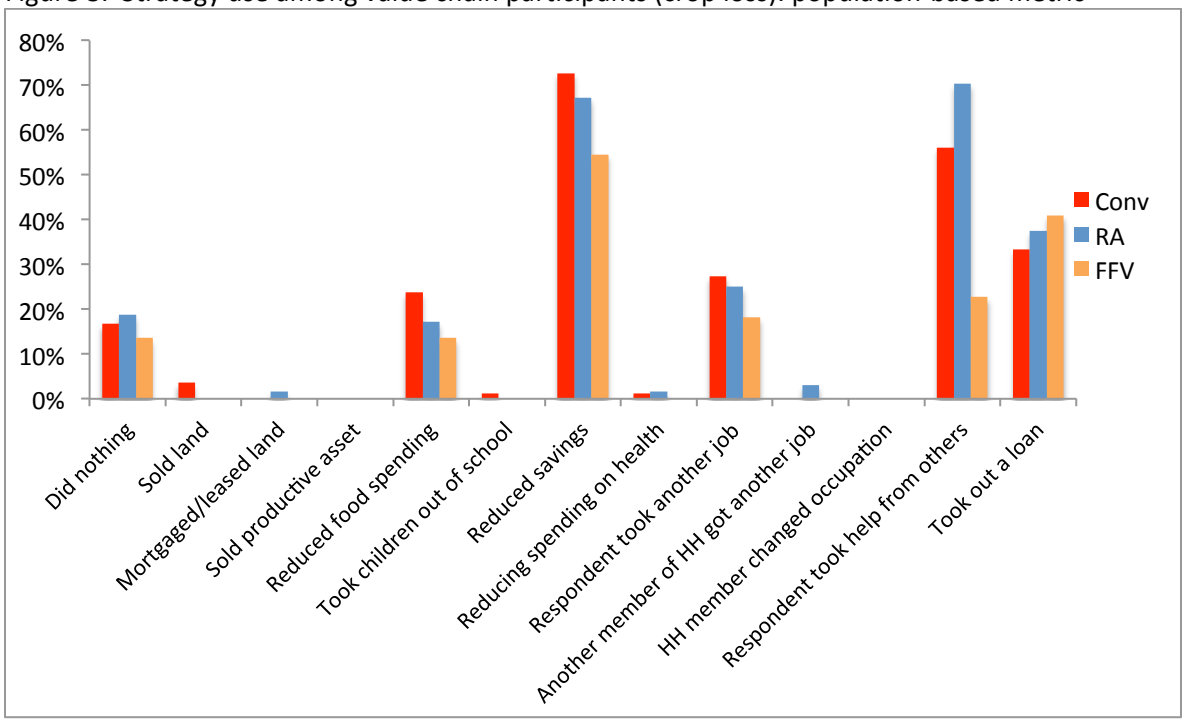


This interpretation of risk management must be met with caution. To base policy or programmatic changes purely on instance-based metrics can give a limited view of how individuals are really reacting and where policy money, time, and energy can be best spent. It certainly depends on the particular question pursued and weather or not emphasis is placed on the absolute use of a particular strategy, or relative use within a particular group against a particular risk. For example, a top strategy for conventional growers (taking children out of school) was only used in two instances, across risks—signaling low absolute use amongst the

individuals sampled. Yet, 50% of these instances (or in this case, 1 instance) occurred as a result of crop loss, the other 50% (again, 1 instance) was employed in the event of a separation or divorce. To say that 50% of child education withdrawals occur because of crop loss or divorce is likely misleading as it exaggerates and perhaps distorts the reality that taking children out of school is a rarely used—in the absolute sense—risk management strategy for conventional value chain participants. This metric is perhaps more useful when value chain interventions are traying to target or isolate particular behaviors—common or not—and understand the unique circumstances that might potentially trigger use. When instance-based metrics are used in this study, the use is stated. This method is used later in this section when we try to understand the risk-specific conditions around which particularly damaging risk management behaviors occur.

Measuring the popularity of a strategy amongst the group surveyed (*prevalence of use amongst value chain participants*), can be more helpful in identifying risks and strategies that characterize groups (Figure 8). This metric offers a common, comparable baseline for determining patterns within comparison group, and is specific the certain risk inquired about; in this case, crop loss. For crop loss we see that some strategies, regardless of value chain membership, are more popular than others—most interestingly, strategies that employ the use of financial tools. Having laid this basis for using *prevalence of use* amongst value chain participants as our basis for comparison, we turn to differences in risk management strategies between value chain participants.

Figure 8: Strategy use among value chain participants (crop loss): population-based metric



Risk Management: Results

Looking back over the last five years, farmers across value chains reported over 2,427 instances of risk management. Amongst the 84 conventional growers, farmers stated that they used a combined total of 1,260 strategies[16] to manage the risks inquired about, indicating 14.7 instances of risk management per grower. Despite a slightly smaller sample size (69 RA/org versus 86 conventional), RA/org growers used a combined total of 868 strategies to manage crop loss, over 12.6 strategies per person. FFV growers indicated 282 instances when risk management tactics were used, over 12.8 instances per person.

In Essay 1, we saw slight differences between growers when we asked growers which risks they were most concerned about (e.g, measuring risk severity) versus the shocks they delt with most

[16] Recall that growers were asked to provide a minimum of two and a maximum of three ways that they managed a shock or risk—as a result, a strategy may be used multiple times in response to different risks.

frequently. This chart combines those results with findings that illuminate the most 'managed' risks (Table 11).

Table 11: Risk ranking (severity, frequency, and most managed) amongst VC groups

Risk-type	**Conventional growers**	**Rainforest Alliance growers**	**Fine Flavor growers**
Most 'severe' risks faced	1. PC cheating 2. Labor costs (tie) 2. Crop loss (tie)	1. Crop loss (tie) 1. Labor costs (tie) 2. PC cheating	1. Labor costs 2. Input prices (tie) 2. PC cheating (tie)
Most 'frequent' risks faced	1.Crop loss 2. Low premium/prices 3. Labor costs	1. Crop loss 2. Labor costs 3. Input prices	1. Crop loss 2. Low premiums/ prices 3. PC cheating
Most 'managed' risk	1. Crop loss 2. Labor cost 3. Low price/premium	1.Crop loss 2. Labor costs 3. Low price/premium	1. Labor cost 2. Unexpected social expense 3. Death of household member (tie) 3. Crop loss (tie)

Differences between frequency ranking and managed risk ranking results from growers using between 1-3 risk coping strategies to manage a particular risk. Which is to say, that increasing labor costs may, for example, require a more diversified risk management approach than another risk, say, PC cheating or increases in input prices. Between risks that were perceived as severe and risks that were actively managed, we see an interesting divide. While all three growers said that PC cheating was a severe risk, it is not commonly managed across any of the three groups. Moreover, household member deaths and accompanying social expenses may reflect idiosyncratic shocks experienced by numerous FFV growers.

Growers across value chains used a diversified approach to managing price, production, and human/social risks. Based on a literature review of smallholder risk management trends (see the introduction and first section of this essay), we outlined a framework for thinking about risk management into three distinct categories (Table 10). These included the use of financial tools, calculated production decisions, and attempts to allocate resources differently. How this

framework intersects with the risks and coping strategies outlined in this study is portrayed in Figure 9. Financial tools inquired about in this survey include reductions in savings, taking help from others (informal lending through family, friends, and neighbors) and loan taking (which included lending from the PC or supplier-driven credit schemes, in addition to banks, village saving associations or micro-credit agencies). In this research and elsewhere, use of financial tools designates the first line of defense against shocks when they occur in order to smooth income and safeguard consumption.

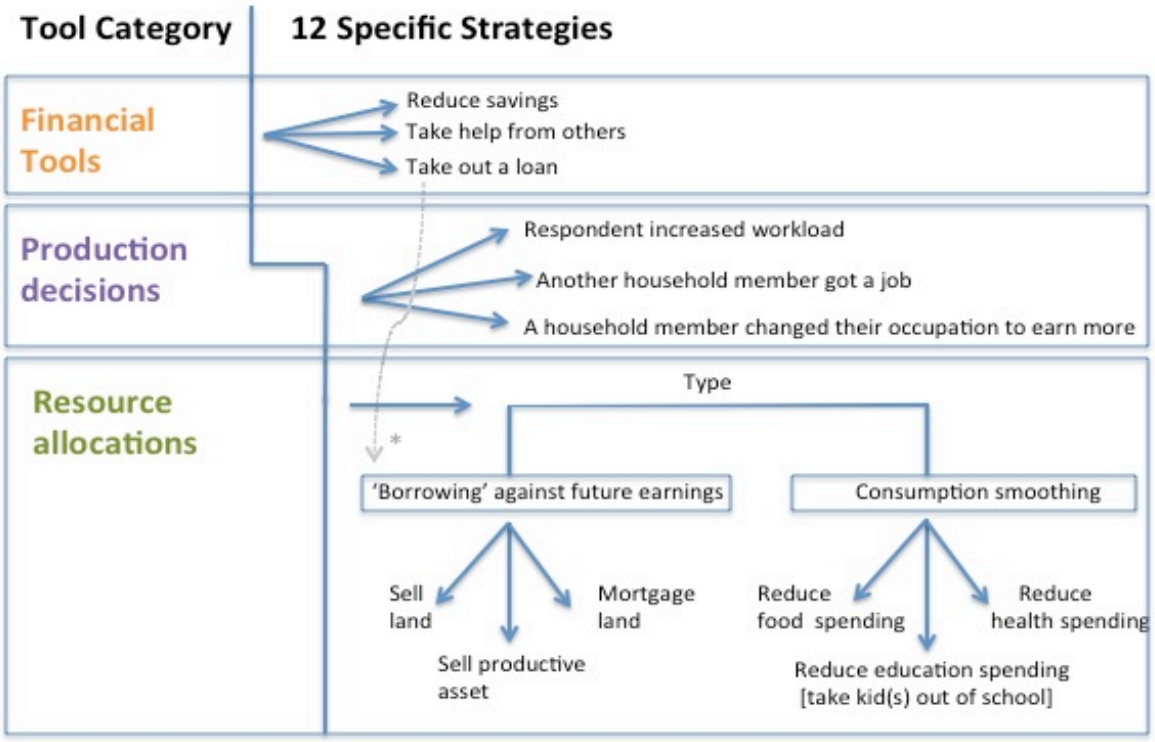
Production decisions include decisions to reallocate farm inputs differently. As a result of the difficulty in controlling farmers at different stages of cocoa production (and thus utilizing different levels of inputs) as well as differences in cocoa input intensification across input categories for RA/org, conventional, and FFV, we choose to narrow the scope and focus purely on labor inputs. As such, risk management tools related to production decisions included respondents[17] getting another job or intensifying workload, in addition to household members either changing their occupation, or finding additional work. This too was identified as techniques consistent with Morduch (1994) definition of income smoothing, the likes of which could incur significant gains or losses in household income, wellbeing, and future opportunity.

Finally, identifying instances of alternative resource allocation provides important insight into consumption smoothing practices. When households cannot borrow or increase earnings to smooth reductions in anticipated farm-income, the alternative is to reduce consumption (reduce health, food, or education spending) or to borrow against future earnings by sale of productive

[17] Respondents, almost exclusively the male or female head of house, claimed to be the primary cocoa producers within their given household.

assets (including animals or equipment) or the mortgage or sale of land[18]. The development and welfare problems associated with cuts to these important consumption categories or reductions in future income potential needs no underscore.

Figure 9: Framework for studied risks and coping strategies



Source: Author's creation, 2012
*Admittedly, interest paid on loans can be considered a liability against future earnings. For these purposes, it remains categorized and analyzed as a financial tool.

Coping strategy usage across value chains show clear consistency amongst VC participants to utilize liquid financial assets first, then reallocate labor assets, and finally reduce specific consumption categories. In rare cases we see reductions in education and health spending, and sale of productive assets (Figure 10).

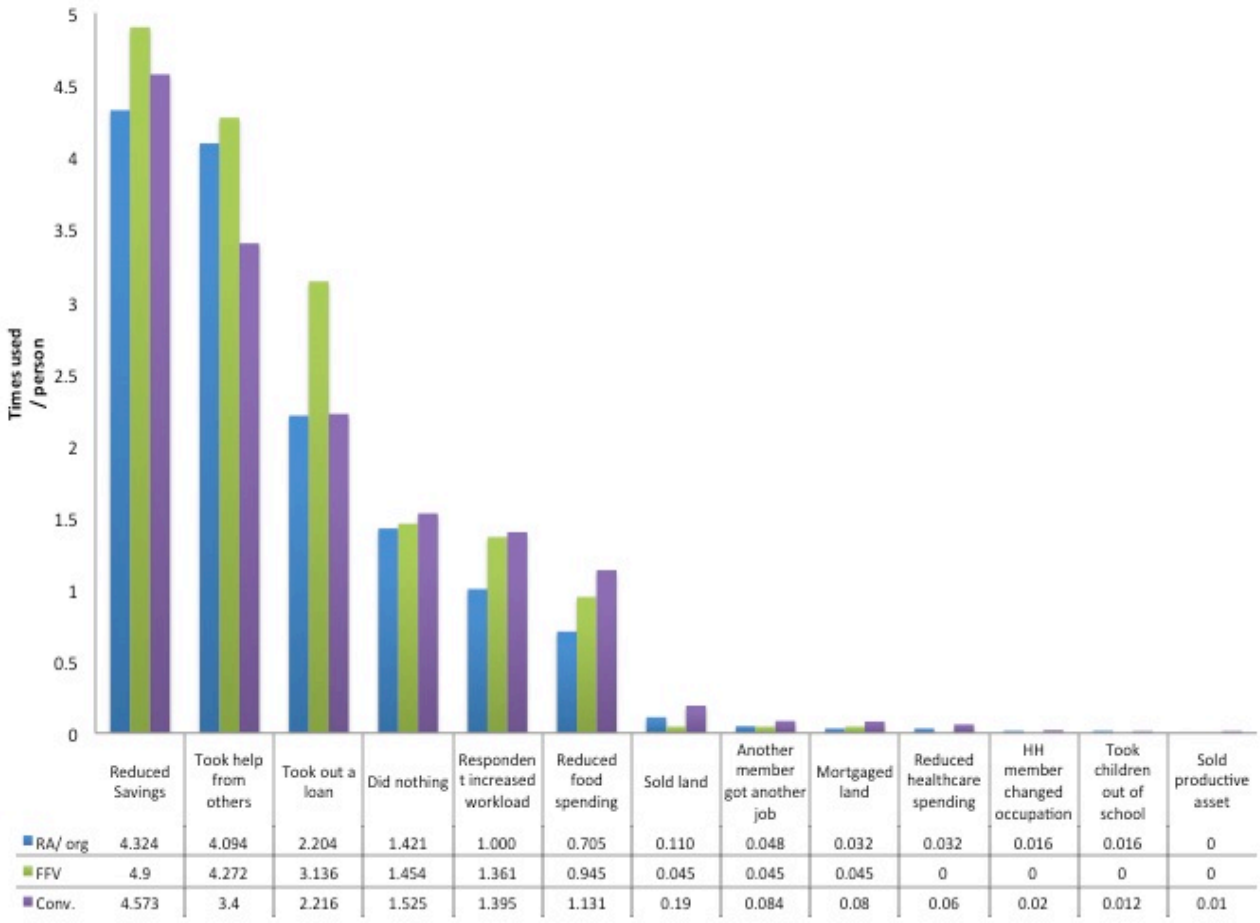
[18] Reductions in these areas can lead to chronic, 'poverty traps', a conceptual review of which can be found in Carter and Barrett (2006).

Recall equation 1:

$$S_t = (R - C) + W + B_{f,} + B_i - P_{t-1} - \left(C_f + C_e + C_h\right) + A_s - A_p$$

Consider how savings is the primary risk management objective and how other risk management and productivity tools (asset purchase, A_p), can be used to maximize or supplement 'buffer' savings. The strong weighting of financial tools (formal and informal borrowing, $B_{f,}$ and B_i), is followed by flexible household labor (e.g, household wages, *W*) then food spending (C_f), asset liquidation A_s, and finally the remaining consumption categories, C_e and C_h. Important distinctions can be made here in this univariate analysis as well as in the regression (multivariate) analysis in the following essay (Essay 3). Whether or not these differences can be credited to the services of local NGOs, geographic location, or the construction of the value chain itself are now explored further.

Figure 10: Risk Management Strategies Employed Over 5 Years



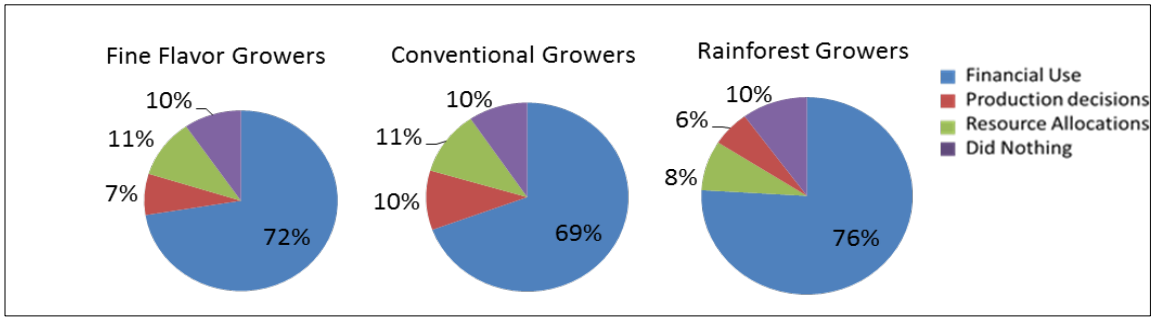
	Reduced Savings	Took help from others	Took out a loan	Did nothing	Respondent increased workload	Reduced food spending	Sold land	Another member got another job	Mortgaged land	Reduced healthcare spending	HH member changed occupation	Took children out of school	Sold productive asset
RA/ org	4.324	4.094	2.204	1.421	1.000	0.705	0.110	0.048	0.032	0.032	0.016	0.016	0
FFV	4.9	4.272	3.136	1.454	1.361	0.945	0.045	0.045	0.045	0	0	0	0
Conv.	4.573	3.4	2.216	1.525	1.395	1.131	0.19	0.084	0.08	0.06	0.02	0.012	0.01

Units: Number of times a particular risk is used within five years, per VC participant.
Note: FFV group= 22 participants, RA/org =69 participants, Conv = 86 participants.

Use of Financial Tools

The use of financial tools was pervasive across risks and across value chains. In total, 2,442 instances of risk management were used over five years. On average, growers used financial tools at an average of 72.3% (Figure 11). The close similarity between groups in their average usage of tools is surprising.

Figure 11: Risk management: category breakdown



Throughout this section we make a distinction between three types of credit, including formal, informal, and PC-driven credit. The latter is supplier driven credit given by the PC. These loans can be taken throughout the year for farm or personal needs. Formal avenues include those offered by businesses or institutions, where farmers engage in contracts and scheduled payments, collateral agreements, and credit worthiness checks. Here, this includes banks, microcredit agencies, and moneylenders. For many farmer groups, frighteningly high collateral requirements, steep interest payments, and general distrust of formal lending entities may depress local credit demand and perpetuate the problem of missing credit markets (Boucher et al 2008).

Informal credit includes loans from friends and family, some of which may be repaid in full, others that are given with the implicit expectation that the lender will, at some unspecified day, require some kind of help of the borrower. Informal lending options may indeed succeed in lowering the cost of debt or maintaining the needed flexibility for application to farmers and farming operations but they are not without their own, unique sets of problems. For example, the social "burden" of these debts or obligations is often overlooked and is not well understood. Methodologically, it is often difficult to distinguish levels of or amounts of shared wealth due to complex social networks. Measuring the informal credit coverage can be a challenge when

individuals and communities do not distinguish personal assets from family assets and individual savings from inter-familial or community transfers (Dercon, 2000).

We focus primarily on these tools, in addition to use of savings, in trying to understand how growers in different value chains (VCs) access and utilize finance and credit. Combined, the following analysis gives an idea of whether or not this liquidity is enough, what specific risks these financial tools address.

Using Savings

The majority of growers (85% of conventional, 87% of RA/org, and 96% of FFV growers) indicate that they are able to regularly save some amount of money. Saving for emergencies and children's school fees dominated the saving categories for all three chains. However, FFV growers prioritize saving for emergencies and basic necessities (57.1%), while RA/org and conventional growers prioritize children's school fees (52% and 61.8%)[19]. Additionally, another important divide exists between saving mechanisms. 40% of conventional growers choose to save with formal banks and 52% save informally in the home. Growers in the high value chain move between extremes: 80% of FFV growers utilize formal banks for saving, while only 16% of RA/org growers do[20]. Regardless of the method of saving, however, the majority growers in all three groups state that their income only allows them to save a little. Variations between the three groups for income sufficiency proved not to be significantly different; between 8-12% of the total group surveyed said they were able to save a lot, with 0-2% saying their income was really insufficient, and most individuals stating that their income allowed them to save 'a little.'

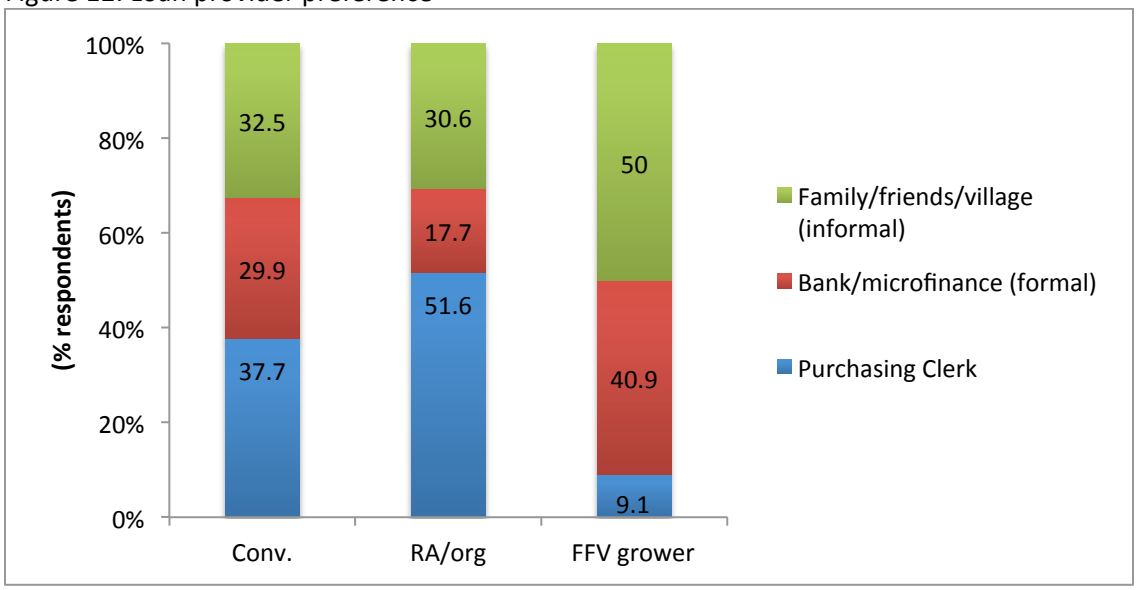
[19] These differences are significant with p= .003.
[20] This could certainly be due to the proximity of FFV growers to the urban center of Kumasi, where a substantial amount of banks have branches, ATMs, and country hubs. RA/org growers surveyed are much farther away.

Access to Credit, Credit Constraints, and Available Lenders: Differences Amongst VC Groups

Between the high value groups, preferences and access to informal liquidity sources appear to be different. 50% of FFV growers stated a preference to first pursue a loan from friends, family, or local neighbors, with the remaining bulk (40%) stating a preference for formal outlets (banks, microfinance agencies, moneylenders). With RA/org growers we see a different distribution of preferences; 50.8% preferred loans from the PC and only 30% stated that they would look for loans from friends, neighbors, and family[21] (Figure 12). The inference here is that it is possible that between these two groups differences in community-controlled credit exist, although, to be sure, this study did not explicitly gather that information. Whether or not FFV growers are more 'socially connected' or if the area that they live and farm in (Offinso region) is less credit constrained due to proximity to the urban center of Kumasi (where numerous banks and financial institutions reside) is unknown.

[21] Means testing showed at significance at .15 with p= .136.

Figure 12: Loan provider preference



Understanding how the credit terms differ between these two outlets (PC lending in RA/org communities versus social lending in FFV communities) is additionally unknown. Speaking about social networks, Vanderpuye-Orgle and Barrett (2009) suggest that informal lending can exclude certain groups, including those that who are not advantageously connected. In this context, it would seem that the *type* of connection between lender and access really matters. The dominance of the PC as a lender in RA/org communities suggests that cocoa production is prerequisite to credit access, perhaps suggesting that there is less mobility within these growers to expand into other ventures or opportunities. Conventional growers in this study would seem to have more mobility as they are able to choose from a variety of credit access options. In all three chains, social networks play an important role, but in FFV production, the social lending network dominates as the principle credit provider. Considering how chain growers are connected to loan providers does not appear to signal how the credit is eventually used. In fact, in this study, we found no significance difference between groups when we asked them what the

credit they took out recently was used for. Amongst conventional, RA/org, and FFV groups, most growers used credit for on-farm investment (37.5%, 43.9%, and 47.1%, respectively).

Knowing that differences in loan preference exist between the two high value groups, one way to triangulate differences in community liquidity would be to determine how loan preferences relate to perceptions of credit sufficiency and how perceptions of credit sufficiency relate to VC groups. Growers grouped by their loan preference indicated whether or not they felt that that loan was sufficient for their needs (Table 12). Mean differences between constrained and unconstrained credit groups were highly significant.

Table 12: Cross-tabulation: loan sufficiency and provider preference

		Where to find a loan?			
		Purchasing Clerk	Bank/microfinance (formal)	Family/friends/village (informal)	Other
		Column N %	Column N %	Column N %	Column N %
Loan sufficiency	Yes it was enough	40.8%	57.6%	61.1%	50.0%
	No it was not enough	40.8%	27.3%	5.6%	.0%
	I did not take a loan	18.4%	15.2%	33.3%	50.0%

Unconstrained credit access was dominated by lending preferences for family and friends, followed by formal avenues of credit, and finally by PC driven credit. When we analyze credit constraint by VC group we see a similar result: VCs that have access to informal credit through social networks (like FFV) are more likely respond that they have access sufficient credit for their needs (Table 13). For FFV growers, 83% say that they were able to access enough credit for their needs, while only 57.8% of RA/org growers and a mere 38% of conventional growers claim they have access to enough credit. Again, the difference between groups is significant at 1%.

Table 13: Loan Sufficiency and Value Chain Group

		GrowerVC					
		Conventional grower		RA/org grower		FFV grower	
		Column N %	Count	Column N %	Count	Column N %	Count
Loan sufficiency	Yes it was enough	38.2%	21	57.8%	26	83.3%	15
	No it was not enough	27.3%	15	28.9%	13	11.1%	2
	I did not take a loan	34.5%	19	13.3%	6	5.6%	1

Lastly, growers appear to use these tools for slightly different purposes. Two out of three of the top uses for FFV credit include social risks, namely, compensating for unexpected deaths and social expenses. Per capita use of finance tools for RA/org growers, were used for production risk, and price risk. This is consistent with findings in essay 1 which pointed to RA/org growers perceiving higher exposure in these areas, especially in production risk. This is not to say they aren't managing these risks. In fact, RA/org growers were found to be less credit constrained than their conventional counterparts. On the other hand, conventional growers managed a mixture of risks with financial tools, crop loss and labor costs, as well as unexpected social expenses.

FFV growers appear to benefit from greater credit availability through informal credit access, namely through friends, family, and other community members, in addition to a higher usage of formal credit avenues like banks and micro-lending institutions[22]. This may explain why FFV growers demonstrate slightly higher per capita uses of financial tools (see Figure 11). Conventional growers are more diversified in their credit options, but they claim to face the highest levels of credit constraint. Why so? This may be due to poor relationships between the

[22] A note on possible endogeneity: within close village communities is entirely possible that idiosyncratic, human/social risks (like death or unexpected social expenses) could be inextricably linked to increases (decreases) in social liquidity. Which is to say, that community lending from friends and family might increase when human/social shocks occur. When we look at FFV risks managed (death and an unexpected social expense like a funeral or a wedding) and the method by which they manage them (mainly through friends and family), one can't help but wonder if higher rates of community-lending are a result of devastating human/social shocks that may be traditionally mitigated by the community at-large.

community and the PC, or the PC and the LBC district manager, who allocates financing funds in anticipation of the harvest season. Regardless, 38% of conventional growers claim they were recently unable to get the amount of credit they needed. It is worth asking if a better lending environment exists in the RA/org system when one considers that RA/org-procuring PCs are likely more dependent on a specific group of producers for meeting RA/org sourcing requirements expected by the parent LBC. When procurement incentives for a PC align with grower needs for credit, it would seem that there would be more flexibility in lending. The following table summarizes the findings for use of financial tools and contrasts to credit use and credit constraint (Table 14):

Table 14: Financial Tool Usage Amongst VC Groups

Group	Loan provider preference:	Most common risk this was used for:	Credit constrained relative to other groups?
Conventional	1. Purchasing clerk 2. Informal: friends/family 3. Formal: banks, etc.	1.Crop loss 2. Labor costs 3. Unexpected social expense	Yes – only 38% can access the credit they need.
RA/org	1. Purchasing clerk 2. Informal: friends/family 3. Formal: banks, etc.	1. Labor costs 2. Crop loss 3. Low price/premium	Somewhat- 57% can access the credit they need.
FFV	1. Informal: friends/family 2. Formal: banks, etc. 3. PC (<10% prefer).	1.Unexpected social expense (tie) 1.Labor costs (tie) 2.Death of household	No – 83.3% can access the credit they need.

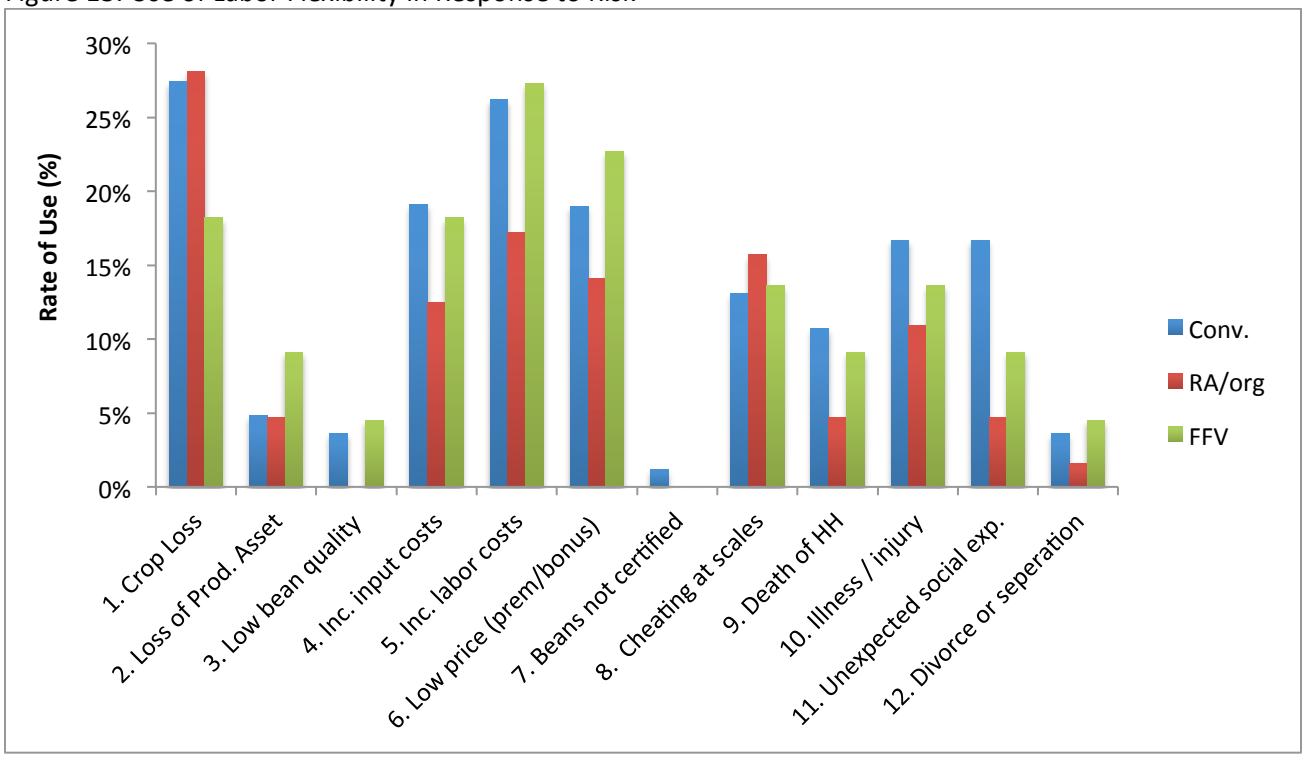
Production decisions

Conservative production and diversification decisions can have a dramatic effect on mean earnings and long-term participation in a particular chain (Michelson 2011; Morduch 1994). For example, Bliss and Stern point to evidence in Palanpur, India of smallholder farmers using lower than necessary quantities of fertilizer on crops, a strategy which allows the user to reduce upfront

investment in a single activity (Bliss and Stern, 1982). Similarly, as seen by Reardon et al. (1994) in West Africa, poor households tend to fragment their land holdings into many plots, grow different crops or divert time and human capital into local farm wage employment (cited by Dercon, 2007). Indeed, very few people collect all their income from any one source, hold all their wealth in a single asset, or use their assets for one activity; diversification, thus, is the norm (Barrett et al. 2001). This flexibility—the capacity to revise certain production decisions—assumes an important role in risk management (Pender and Fafchamps 1997). Changes in labor can have important implications for productivity as well as human health, education (e.g, when children are taken out of school), and household wealth.

In this study, we see that individual and household labor represent important productive assets that can easily and quickly reallocated to different activates. We asked growers if, in response to the risks outlined in the survey, they had responded by increasing their workload (including taking on another job) or if they had manipulated household labor in order to understand the relationship between production decisions and asset diversification. On average, conventional, RA/org and FFV growers engaged in this type of activity sparingly—less than 30% of growers utilize this strategy, on average. FFV and Conventional growers manipulate labor (production decisions) at a rate of 7% and 10%, respectively. RA growers responded that they used this strategy-set the lowest, at an average of just 6% over the last five years (2006-2011). These averages are far below the use of financial tools, yet it is interesting to note that the increase in usage of labor and production decisions is higher for conventional growers when considering all risks managed (Figure 13).

Figure 13: Use of Labor Flexibility in Response to Risk



On-farm diversification and differences in head of household employment can additionally give insight into where productive assets are vested. For example, on-farm diversification can hedge against production and price risk by diversifying into different crops. 74.6% of growers in this sample said they were actively intercropping other crops on their cocoa plots. The vast majority of growers (between 71-88%) responded that intercropping represented below 40% of their household income. Slight differences in means between the three groups were not significant.

Differences in the main labor priorities of the head of house, however, were both significant and interesting to this analysis of production decisions. Respondents surveyed indicated that they were the primary cultivator of cocoa, but it was important to understand if cocoa was their primary occupation. Tiffen (2002) suggests that many cocoa farmers in West Africa think of themselves as 'tree minders' suggesting that their primary occupation was elsewhere. In this

study, the vast majority (between 93-95%) of conventional and RA/org growers said their primary occupation was farming. While the majority of FFV growers considered cocoa farming their primary occupation, 18% of FFV growers identified with an occupation other than farming as their primary occupation. In contrast, only 4.8% and 6.3% of conventional and RA/org had primary occupations other than cocoa farming (respectively)[23].

As a measure of on-farm diversification, the ratio of cocoa plots to total farm plots show that growers across VCs are similarly invested in cocoa at the farm level. However, a significant portion of the FFV group is primarily diversified into other income earning activities, including 18% who do not primarily consider themselves cocoa growers. This is consistent with a grower group who had huge variation in estimated income from this market opportunity (see previous essay 1). Despite this tendency, FFV growers are still more likely than RA/org growers to reallocate labor when a critical shock hits the household, second only to conventional growers who utilize this strategy across risk types. That RA/org growers are not highly diversified in their income opportunities suggests that growers find stability in earnings and do not feel the need to diversify into other opportunities. This would be consistent the low variation in income that is estimated by this group in essay 1. Alternatively—and equally likely—is that RA/org growers may simply have fewer employment opportunities for any number of reasons. Regardless, this evidence portrays unique groups that manage risk differently given that they perceive differences in price, production, and human/social risk exposure and have differences related to savings, labor flexibility and access to credit.

Resource allocations

[23] Between groups difference is significant at alpha= .10 and p= .087.

Perhaps the most severe type of risk management involves transforming productive assets into cash or reducing household consumption in important areas like health, nutrition, or education. We consider the instances and circumstances around risk coping strategies that comprise both. This toolset represents the extreme responses of the desperately poor (Lybbert et al. 2004, Dercon, 2000; Fafchamps 2003).

Sale of productive assets: Evidence amongst VC groups for asset-based poverty traps?

How the poor use any and all available assets when managing risk frames a longstanding debate that includes the existence (or inexistence) of poverty traps. Asset-based poverty traps consider how productive assets including equipment, animals, and land, can lead to reduced future earnings when they are traded in (sold) for a quick infusion of cash (Fafchamps 2003). However, Udry and Kazianga (2005) consider the instances of asset-sale amongst rural households in Burkina Faso when faced with severe drought. The authors found few instances of increased livestock sale after shocks of drought hit the villages, illustrating that even when households had extremely low levels of food intake, households chose to hold on to their productive assets (in this case, livestock) for as long as possible.

In this data set, the instances of productive asset sale was similarly, extremely infrequent. This was true across chain types. However, the distribution of use amongst VC groups is startling and may provide some interesting insights into vulnerability and/or asset holdings (as a proxy for wealth) amongst VC groups. For example, risk management trends for FFV growers point to a 0% usage of this strategy – indeed there is not a single instance. Use amongst RA growers is also low, 6% of RA/org growers (4 instances), sold and asset in light of an unexpected shock. In

contrast, 29% of conventional growers reported coping with a risk by selling an asset. For conventional farmers, the main reasons for selling land was due to crop loss, increasing labor costs, low prices, illness and injury, and unexpected social expenses. In terms of vulnerability and risk coping activities that could be detrimental to long term earnings, this represents an important divide.

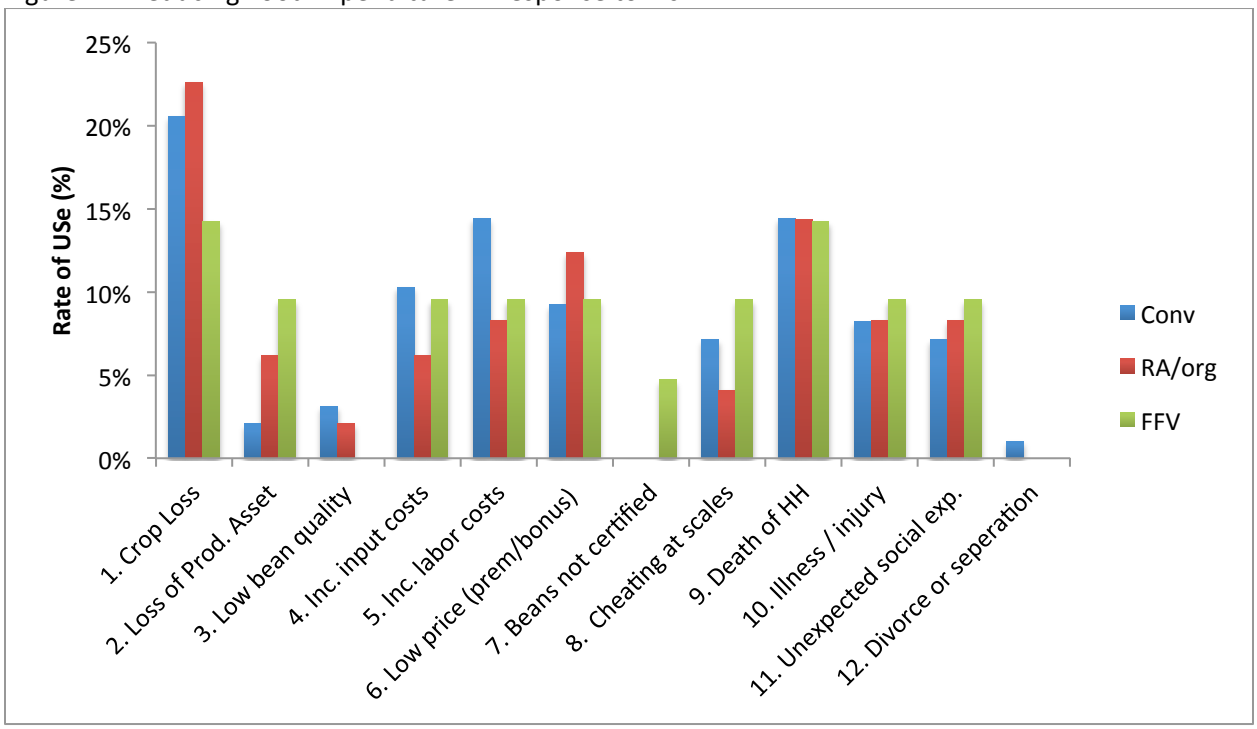
Reducing consumption

When referred to in the literature, the notion of household consumption can often take on the ambiguous 'kitchen sink' quality. This is to say that the term can be taken as a catch-all phrase that simply describes 'all things the household spends money on.' Within this category, a huge variety of important categories exist, including food, health and education, which are three broad categories that we focus on. These are often disproportionately allocated amongst household members due to age, gender, and other qualities (Wispelwey and Deckelbaum 2010; Haddad and Kanbur 1990). How household spending in these categories is allocated amongst individuals intra-household is regrettably not considered during this phase of the research—although a later study rightly should.

Across value chains growers indicated that they were much less likely to sell a productive asset than they were to reduce food expenditures. In fact, reducing food consumption was the fifth most popular strategy across chain groups. 167 instances of risk coping through reduced food expenditure suggests that, on a per-grower basis, over 94% of the growers surveyed had used this strategy. Amongst conventional growers this strategy was most prevalent; with 97 instances in this group, it was used over 1.13 times per conventional grower. FFV growers were slightly less,

95% had used this strategy for managing a shock, and RA/org growers were the lowest users of the group with only 71%. However, qualitative information gathered about individual perceptions on food adequacy over the past 12 months showed that most growers (between 66-77%) felt that their households had adequate food access – with no difference in chain groups. This suggests, perhaps, that temporary reductions in food spending may be a normal way of managing risk for amongst these groups.

Figure 14: Reducing Food Expenditure in Response to Risk



Even though in this study reductions in food spending are less commonly used strategies than, say, taking a loan, knowing the circumstances around which these strategies might be implement may be useful in decreasing usage. By looking at rates of use as a percentage the VC population, we can see the distribution of usage across risks (Figure 14). It is perhaps notable that the strategy is used indiscriminately across risks, suggesting that it is a pervasive, persistent, and

flexible strategy for managing shocks. A normal 'development prescription' might be to increase access to credit, hoping that households would borrow before reducing food consumption. Yet we see use of this strategy at a similar level of use in chain groups that did not perceive themselves as credit constrained. This would suggest that merely increasing credit access may not solve the problem of growers using food consumption as a flexible budget category that can be reduced when needed.

Consumption categories that appear well protected include education and health. Regardless of the value chain, households seem to indicate that a child remaining in school is an inflexible priority. Similarly, it was rare for a household to indicate that they had reduced necessary savings in health.

The poor utilize tools within all three risk management categories, but weight them differently than one might expect. Association with a particular value chain does not change the pattern of risk management which includes a strong preference for use of savings, and then other financial tools, followed by labor manipulation and reallocations of the household budget in food spending Less common are the classic 'poverty trap' behaviors, where growers sell productive assets for quick cash inflows. The priority, rather, is to exhaust financial resources, manipulate labor and food spending, and then move to asset selling. We only see this full progression in the conventional grower group. Even more rare are reductions in household consumption categories like health or education. Together with asset sale, these three strategies represent the very last alternatives of the poor, indicating extreme risk management options which, when they do occur, signal total desperation.

Trends that don't budge: the limits of the value-chain approach

In terms of frequently used tools (financial tools), differences in credit access, lender preference, and community liquidity are evident. More in-depth research could suggest if there are productivity gains could be made from increasing availability of credit to constrained regions like conventional growers or, to a lesser extent, RA/org growers. On the other hand, one could wonder if tying credit to production (e.g, the supplier-driven credit of the PC) creates incentives for bettering on-farm productivity. In this study, yields from RA/org growers, who access most of their credit via the PC, are shown to be competitive with the sampled conventional farmers. Conventional farmers in this study seem to have a more diverse array of credit options, leaving the possibility that they may be tempted to use credit for other endeavors beyond the farm.

While the literature linking credit source and productivity is relatively silent, it does seem clear that RA/org growers are more dependent on PC credit, which may be a function of production-centric value chains that increase the dependency between local buyers and sellers. FFV growers seem to be less concerned about credit through local buyers and more dependent on social credit access (informal credit through neighbors, friends, and family), and formal credit through institutions[24]. Manipulation of labor seems to be an important tool for risk management with clear priorities on how what to manipulate first. For example, across chains respondents indicated that they are more likely to take on work themselves then they are to shift labor within the household. Additional work in this area would consider the tradeoff between labor that is diversified to other functions and on-farm productivity through maximized resource use. Lastly,

[24] Certainly this may change as FFV growers and local buyers of FFV products start working closer together. It is difficult at this point in the FFV pilot to assess the existence of a mutually reinforcing cocoa-for-credit-access relationship (like that observed in RA/org).

growers seem to rarely access inflows of cash that could come from taking children out of school or reducing healthcare costs. Usage of these 'last-resort' tools may signify the desperation that comes after all other options have been exhausted.

In sum, the risk management tools of value chain participants should be of great concern to other actors along the supply chain, namely, buyers and food manufactures who are (or should be) concerned about the financial and productive efficiency of their supply chain. Membership to a particular type of chain does not seem to greatly change the preference or the prioritization of risk management toolsets. However, there does tend to be significant differences in specific tools employed: at this more micro level we may find the value-chain approach more helpful. A generic value-chain approach, however, does not seem break down risk management to this level and thus the specific targeting that could otherwise provide meaningful changes may often be ignored. Perhaps equal to linking farmers through a value-chain approach is appreciating the role that geography, social networks, and available institutions may play. Access to urban hubs may increase rural growers' ability to access formal credit sources or create needed community liquidity (informal credit availability) created through urban employment. Additionally, some clear threshold exists where increases in liquidity (credit availability) do not result in elimination of risk-reduction behaviors that reduce household spending on food. Value chain initiatives that simply provide more credit as a solution ignore the priority farmers place on being able to control and utilize household budget allocation to their financial advantage.

Chapter 6

Essay 3: Are risk coping mechanisms, risk perceptions, and risk benefits important in describing membership patterns?

Univariate testing in essay 1 and 2 showed that growers in the three value chains were dealing with comparable, systemic risks, but at varying levels of concern and exposure. It was also noted that they utilized different strategies at different intensities, but that strategy use overall showed similar preferences for financial tools followed by sparing use of production decisions (labor flexibility) and even rarer use of household consumption smoothing—with the exception of reductions in food spending which was popular and pervasive throughout the growers sampled. All of these results, however, followed a univariate analysis, considering the impact of a single predictor variable on a dependent variable. This dependent variable was most often value chain membership as the intention of this work is to understand the impact that specific risks and attitudes may have on both chain participation and overall welfare and development dynamics.

While this approach considers the impact of a single predictor variable on a response variable, it does not consider how the significance of these variables may change when they exist in a multivariable context and how the contribution of experienced risks and expressed benefits may be correlated, spread, or shared. Moreover, the previous results also consider within-group characteristics, showcasing traits that are pervasive amongst those within the chain, but fail to confirm significance or comment on relative importance when compared to other farmers sample-wide. Using a general linear regression model, we look at how risk coping strategies,

risk preferences, and perceptions of value chain benefits, among other important variables, combine to show the *relative* importance of these traits across the sample space and how significant these characteristics may be in describing the participants within the value chain.

Methodology and Variables Used in Analysis

We use a general linear model to estimate the significance of risk management tools, risk perceptions, and value chain benefits on participation in multiple regression. This is not meant to predict entrance or exit of an individual into a particular opportunity, but to rather suggest that risk management perceptions and behaviors characterize patterns and participation tendencies.

Recall from essay 2 that the 13 coping strategies are categorized in three groups, each according to function. Groupings include financial tools, alternations in production decisions (namely household labor) and instances of consumption smoothing (sale of assets) and household spending reductions in categories like health, food, and education. Risk management tools comprise the 13 coping strategies outlined in essay 2. Per-instance strategy use, S_j was counted across risks for a total coping strategy-use 'score', C_j, where *j* represents the particular strategy used (out of a possible 12) and *k* represents the risk it was used against (out of a possible 13). This summation of per-instance risk management behavior is thus:

$C_j = \sum_{k=1}^{13} S_{jk}$, j=1,12 and k=1,13

We designate risk perceptions as a function of growers anticipated high price expectation, P_{t+1}, their average production, A, and frequency of past exposure to 12 risks, θ_k. Here, *k* represents the particular risk and *t* represents time. Lastly, benefit perception is captured as an indicator variable, L_i, where *i* indicates the i^{th} benefit out of a possible five. These benefits included

access to technical assistance, better access to farm inputs and technology, lower cost of for inputs (including manure), opportunity to receive higher incomes (premiums/bonuses) and access to credit. Finally, we include some key important household demographic indicators (*H)*, including age, family size, education, gender, cocoa hectares, and total farm size. The importance of these characteristics in grower membership, (*Y*) when *Y*=FFV, RA/org, or conventional, can be thus found in the following equation:

$$Y = b_0 + \sum_{j=1}^{12} b_{1j}\left(C_j\right) + \sum_{k=1}^{13} b_{2k}\left(\theta_k\right) + b_3(P_{t+1}) + \sum_{i=1}^{4} b_{4i}\left(L_i\right) + b_5 A + b_6 H + \epsilon$$

Since the dependent variable can take on each of the three value chain groups, the model is run three times in an effort to understand how important these variables are in explaining the participation patterns of each. Table 15 represents the full model with variables sorted into the categories aforementioned (household characteristics, risk coping mechanisms, risk perceptions, and participation benefits).

Table 15: Regression Results

	coefficient	*p value*	*coefficient*	*p value*	*coefficient*	*p value*
	Conventional		RA/Org		FFV	
Household Characteristics						
Respondent age	.001	.772	-.003	.381	.002	.288
Household total	-.005	.541	-.002	.799	.008	.154
Total cocoa cultivated (hectares)	.016	.168	-.022	.083*	.002	.786
Total farm size (hectares)	-.018	.068*	.022	.054*	-.003	.669
Gender	-.046	.590	-.073	.383	.101	.049*
Education	-.022	.320	.009	.687	.016	.401
Risk Perceptions						
Average yield (KG/hectare)	-.021	.115*	.030	.074*	-.011	.415
Price Expectation	-.791	.001*	.599	.002*	.252	.042*
Exposure[25] to Risk 1: Crop loss	.076	.039*	-.050	.234	-.021	.391
Exposure to Risk 2: Loss of Prod. Asset	-.041	.193	-.030	.349	.055	.009*
Exposure to Risk 3: Decreased bean quality	.068	.088*	-.051	.139	-.021	.238
Exposure to Risk 4: Input price increase	.004	.907	-.047	.153	.048	.020*
Exposure to Risk 5: Labor price increase	.057	.118	-.014	.696	-.045	.028*
Exposure to Risk 6: Low price	-.017	.587	.005	.874	.005	.741
Exposure to Risk 7: Product not certified[26]	--	--	--	--	--	--
Exposure to Risk 8: Cheating at scales	.062	.137	-.100	.015*	.036	.214
Exposure to Risk 9: Death of HH member	-.039	.153	-.028	.317	.058	.004*

[25] This refers to perceived frequency over the past 5 years.
[26] Exposure to this risk had very few observations. Tests against this variable were unable to be reasonably estimated.

Exposure to Risk 10: Illness/ injury	-.013	.532	.004	.860	.008	.570
Exposure to Risk 11: Unexpected social expense	.049	.186	-.066	.064*	.014	.444
Exposure to Risk 12: Divorce/ separation	-.070	.047*	.035	.378	.030	.139
Risk Coping Strategies						
1: Did nothing	-.008	.748	.026	.309	-.011	.556
2: Sold land	.105	.085*	-.098	.103*	-.012	.706
3: Mortgaged land	.113	.348	.012	.921	-.092	.135
4: Sold productive asset	.051	.847	-.045	.885	.004	.946
5: Reduced food spending	.004	.911	.022	.537	-.015	.401
6: Reduced education spending	.507	.061*	-.256	.191	-.211	.437
7: Reduced savings	.002	.938	.034	.125	-.037	.001*
8: Reduced spending on health	-.107	.107	.109	.115	.006	.902
9: Respondent increased workload	.039	.079*	-.013	.535	-.023	.068*
10: HH member got another job	-.155	.048*	.179	.086*	-.005	.923
11: HH member changed occupation	-.220	.283	.209	.176	-.181	.083*
12: Resp. took help from others	.004	.870	.032	.148	-.033	.002*
13: Resp. took out a loan	-.025	.239	.017	.388	.010	.464
Participation Benefits						
1: Receive technical assistance	.158	.100*	-.175	.181	.014	.801
2: Better access to farm inputs and tech.	.106	.220	-.003	.972	-.120	.025*
3: Lower cost for inputs (fertilizer, manure, etc.)	.074	.382	-.148	.091*	.079	.132

4. Opportunity to receive higher income	-.031	.791	-.199	.175	.213	.064*
5. Access to credit	-.068	.394	.129	.130*	-.027	.552

Positive, significant correlations in these results suggest that as the variable identified increases, likelihood of participation in the corresponding value chain also increases. Negative correlation indicates the opposite; that participation likelihood decreases when the variable quantity increases.

Widely used or rarely used: Insignificant characteristics in the multivariate context

A few important observations can be made before discussing how household characteristics, coping strategies, risk perceptions and participation benefits appear to characterize membership patterns. The first is that some of these variables are insignificant across groups, which is to say, that they are either extremely prevalent across groups (e.g, that everyone uses them and thus they do not distinguish one participant group from another) or are extremely rare (e.g, that the variance between usage is so uncharacteristic that it says little about *relative* importance). In terms of risk coping, 'doing nothing', mortgaging land, selling productive assets, reducing health spending, reducing food spending, and loan taking characterizes these 'widely used or rarely used' options. This provides two important insights. First, amongst these groups, the probability for engaging in poverty-trap behavior increases with conventional chain participation. These behaviors include selling land (beta coefficient =.128 with p= .085) and reducing child education spending (beta coefficient= .507 and p=.061).

Secondly, across groups it is evident that reductions in food spending represent widely used strategies while reductions in health spending are rarely employed. As a result, neither are significant in characterizing chain participants. This suggests that while food budgets are perceived as a flexible, easy way to align consumption with reduced earnings, reductions in health are not[27]. Essay 2 provided these exact findings in the univariate context. Similar to reductions in food spending, loan taking is commonly used strategy amongst chain participants. Notably this result does not comment on the credit availability, credit terms, or burdens of debt with each group or within the sample. Rather, it merely suggests that loan taking does not distinguish one group from another nor increase the likelihood that an individual participates in conventional versus high value cocoa. We now continue with important distinctions that appear to characterize chain participants.

Household characteristics

In essay 1, (see descriptive results, Table 6) age was found to be statistically significant. However, means testing between VC groups amongst variables including household total, total cocoa, total farm size, gender, and education were found to each be statistically similar, meaning that no meaningful differences existed between groups. In the regression results, education and household total are similarly insignificant in determining participation differences. Increases (decreases) in household size, age, and education level do not appear to bias participation into one group or another. However, total farm size and cocoa farm size are two variables that do

[27] I fully recognize that this separation between health and food consumption is unfortunate and perhaps misleading. Certainly food consumption is implicitly linked to current and future health. Separation was necessary in this study as we attempted to understand how specific health investments like medication, doctors visits, surgery and the like were affected by decreases in income. The intention was to isolate food as a important, distinct category that could allude to current and future wellbeing and opportunity.

seem to influence participation in certain chains. For example, as total farm sizes increase, likelihood of RA/org participation increases. The opposite is true for conventional farmers where estimates show that a decrease in farm size decreases the likelihood of an individual being a conventional farmer. While univariate means testing on total farm size showed no significant difference between conventional farmers who had an average of 12.8 hectares and RA/org growers who had 10.7 hectares, regression analysis showed that as farm size increased, the likelihood of RA/org participation grew.

Yields and Price Expectations

Concerns about linking growers to 'high value' markets through certified production practices have often centered on notions of reduced short-term productivity due to reductions in input use as well as elevated production costs. Univariate analysis found that RA/org growers are not only competitive on yields with their conventional counterparts, but that they also report lower than average production costs when compared to national, conventional costs estimated by the CRIG. Multivariate analysis further supports this finding by suggesting that a rise in average yield increases the chances that a grower participates in RA/org (p value = .074 and beta coefficient =.030). This is an important finding that suggests that third party certification can successfully align clear business objectives to increase productivity along the supply chain while providing opportunities for important development goals like increased earnings, on-farm sustainability, and other spillover benefits (similar findings were uncovered in Govereh and Jayne 2005).

Price expectations were shown to be highly significant in previous analysis. In this relative context, regression results similarly show that conventional growers are described by expecting

much lower prices than both RA/org and FFV, a finding which is somewhat intuitive. Conversely, as growers expect higher and higher prices, the likelihood of being a FFV or an RA/org grower duly increases. Since FFV growers have high variation and a small sample size, increases in price expectation are more closely linked to RA/org growers, but for both groups, relative increases in price expectation tends to come from participants likely to engage in high-value cocoa participation.

Risk Perceptions: Exposure to Shocks

Looking at relative risk exposure across the 12 risks can give some important insights for program managers and policy makers looking at how value chain approaches might be designed in order to avoid, redistribute or minimize risks as well as discourage risk coping behaviors that can be counterproductive to development goals. In the previous section on risk preferences the analysis showed that perceptions of risk are a function of both risk frequency and severity. However, as reported in essay 1, risks that are frequent are not always the same as those that are deemed severe. Individual measures of severity can be quite subjective and vary widely within groups, making it difficult to implement policies and target the most vulnerable. While still imperfect in terms of identifying total vulnerability, measures of frequency offer a good starting place for identifying value chains that have elevated risks. In this multivariate analysis we examine how exposure to certain risks might characterize and subsequently increase (decrease) membership into a particular group. Knowing if certain chains are characterized by growers managing greater or fewer instances of price, production, and human/social risk can provide awareness of how to utilize and modify value chain approaches.

For FFV growers and conventional growers, some positive correlations occur between risk exposure and type of group membership. For conventional growers, a relative increase in crop loss risks and poor quality each significantly increase the likelihood of membership in conventional chains. The opposite (e.g, negative correlation) occurs for FFV growers and crop loss. Direct correlations between crop loss instances between FFV growers and other chains should again be considered with caution, due to the infancy of the FFV project and the fact that full production risks, including crop loss, may not have been experienced. That aside, for FFV growers, membership likelihood positively increases when productive asset loss (theft, etc.,) occurs, or when increases in input prices or household deaths are experienced. Somewhat remarkably, RA/org participation patterns show no positive correlation between any particular risk exposure chain membership. This suggests that RA/org chain members are not characterized by relative extreme vulnerability and increased frequency of risk exposure is not an inherent aspect of participation. This is not to say that RA/org growers aren't making tradeoffs or that they aren't managing risk. Rather it is that the likelihood of consuming higher levels of risk exposure when compared to conventional or FFV counterparts appears to be diminished.

In fact, membership in conventional cocoa appears to increase in tandem with several risks, including crop loss and decreased bean quality. For high value cocoa growers, numerous *negative* correlations are found between high value membership and risk exposure. This appears to be a unique quality of high value chain participation—conventional grower participation patterns have no significant reductions in risk frequency for the risks discussed[28]. For example, RA/org growers appear to be characterized by low relative frequency of 'cheating at the scales.'

[28] An exception exists for instance of divorce or separation, conventional growers, for unknown reasons, are characterized by less exposure to this household shock. This risk has not been analyzed in detail, but merely adds insight into the lives of growers.

Although growers across chains responded that these are important, 'systemic' risks in cocoa production, high value growers tend to face the cheating risk at a lower rate than growers in conventional chains. This result was corroborated and commented on during results explained in essay 1. For RA/org growers, relatively less cheating at the scales may be a result of increased transparency between farmers, technical assistants, NGO staff, and others who are actively aware of farmer production and yields. This 'invisible spillover benefit' appears to be making a meaningful contribution to grower welfare and risk reduction.

Additionally, the likelihood of RA/org grower membership also increases when fewer instances of 'unexpected social expenses' occur. This may occur for several reasons. First, RA/org growers may not consider unexpected social expenses as a 'shock', either because these events occur less frequently, or because these events are less financially taxing for associated than in other communities. Second, RA/org growers may have greater social safety nets in place, which may distribute this burden on to other members of the family or local community.

Risk Coping Strategies

Looking at the impact of risk management on livelihoods between high-value versus conventional farmers suggests differing levels of vulnerability. Conventional growers are characterized by strategies that include land selling, reductions in education, and increasing the workload and work intensity of respondents. Selling of land as a risk coping strategy in order to smooth current income can have long-term impacts on earning potential, as this paper has discussed in detail (Dercon 2005; 2000; Fafchamps 2003; Morduch 1994; 1995). This represents a core asset-based poverty trap as identified by work by Carter and Barrett (2006). Similar to

asset-based poverty traps is the possibility of encountering cognitive-poverty traps. As outlined in Knight et al. (2009) a cognitive-poverty trap can occur when low educational expenditure, poor childhood health, and poverty create critical gaps in reading, writing, and cognitive ability. This can create lower lifetime earnings and reduced opportunities for the individual and his or her future household. When we consider that conventional growers are more likely to respond to a risk by pulling children out of school, we consider the potential for these cognitive poverty traps, in addition to asset-based earnings poverty traps.

Lastly, an increase in respondent work-load suggests that household heads in conventional households are more likely to increase personal workload rather than spread the responsibility for increasing earnings on to other household participants. In contrast, RA/org growers are more likely to 'share' the labor burden with others in the household and FFV growers are less likely to do either type of labor manipulation. Quite notably is the evidence that RA/org growers appear to be well diversified in approaches and that they do not overly rely on welfare reducing household consumption strategies nor do they tend to rely on their ability to 'borrow from the future' by selling productive assets, including land.

FFV growers are characterized mostly by what they choose not to do, relative to other groups. Here we see significant departures from univariate analysis and multivariate analysis, specifically in the instance of use of financial tools. In objective two, the within group use—that is to say, within the sample size of FFV growers—of financial tools appears to be consistent or occasionally more pervasive than use within RA/org and conventional grower chains. Subsequent triangulations supporting this considered how credit-provider preferences pointed to FFV growers utilizing informal as well as formal avenues for credit, findings that suggested

greater liquidity within FFV communities. However, relative to other groups in the multivariate context, the findings in this analysis do not support this[29]. In fact, taking help from others (informal credit) and use of savings are relatively *less* likely to be attributed to FFV participants. This brings back a familiar issue of measurement previously discussed in objective one; that per-usage (instance metrics) and population metrics can provide interpretations that are quite different. Qualitative data and field-interviews, however, tended to corroborate the evidence uncovered in ANOVA and univariate tests which confirmed high usage of financial tools amongst FFV growers.

Regarding consumption smoothing and production decisions (individual and household labor allocation), correlation between FFV participation and use of these strategies are each negatively correlated. This means that FFV growers are unlikely to engage in these types of activities and tradeoffs when compared to conventional and RA/org growers. When intra-group usage was explained in objective two, we similarly found low or non-existent usage of these coping mechanisms. However, for FFV growers, this may leave more questions than answers. FFV growers are certainly hedging risks of production in some way, but it is unclear from the data exactly how. We know that they are not engaging in consumption smoothing tactics (form this analysis and the analysis in objective two), that they are using credit access when needed (see objective two), that they reallocate labor when necessary, and finally that they reduce food when the circumstances call for it. Yet this evidence shows that they do most of these things less than

[29] Some distributions of tool usage, including financial tools, amongst FFV participants is non-normal. As a result of a small sample size heteroskedasticity issues cannot be denied.

the other groups surveyed[30]. How could this be? For one, it is highly possible that a number of these growers are simply less dependent on cocoa or less income-dependent on agricultural activity in general. This is supported by previous tests that found that a significant proportion of FFV growers do not consider themselves primary farmers which could suggest that instead of hedging risk with other agricultural activities or the sale of agricultural assets (land, inputs, equipment, etc.) they might be simply relying on other activities for income.

Value Chain Benefits

Distinguishing between benefits and membership likelihood offers little additional insight beyond that which was explored in the previous analysis. FFV members are more likely to include growers who respond that they appreciate having access to a higher value market opportunities (which is consistent with the groups expectations to receive higher prices) and less likely to include those who say they receive better access to farm inputs and technology. However, this is tempered by an increased likelihood of FFV growers benefiting from lower costs of fertilizer and manure (p=.134 and beta coefficient =.084), which seems reasonable since FFV growers are currently receiving seedlings free of charge as part of the initial pilot.

Additionally, individuals who say that they receive credit as a benefit of value chain participation are more likely to be RA/org growers. This is interesting and important when we think about results in objective two that show that RA/org growers disproportionately rely on the local PC as their primary credit source. PCs who buy RA/org may be more dependent on RA/org growers to help fill specific contract volumes that are the responsibility of the PC to fill. This may create

[30] Based on the analysis in objective 2, however, credit use is still thought to be used at higher rates han growers in RA/org and conventional. Reduced credit constraint supported by evidence of greater liquidity through formal and informal sources was shown to be significant and are emphasized despite the results of this regression analysis.

greater incentives to increase lending and provide greater amounts of PC credit, providing RA/org growers with a benefit they might not otherwise be able to access. The fascinating relationship between PCs and different types of cocoa value chain participants should be further explored in future research.

Three New Ways to Characterize Value Chain Participation: Risk Perceptions, Behaviors, and Perceived Benefits

Risk perceptions and risk coping strategies appear to characterize and influence participation patterns amongst the various cocoa chains analyzed. Analysis in essay 2 and here, in essay 3, confirmed that there are significant differences in what farmers are exposed to (risk exposure), how they think about it (risk perceptions) and what they do about it (risk coping). A value chain approach needs to take into account the ways in which linking farmers to new markets drives smallholder behaviors and if those behaviors promote the objectives of donors, NGOs, governments, and other individuals and organizations interested in promoting pro-poor solutions to rural poverty, or if they inadvertently perpetuate problems.

Regarding coping strategies, conventional growers in this chain are much more likely to engage in the kind of risk coping strategies that are potentially damaging to current and future wellbeing. Ostensibly, this would make sense given that conventional growers seem to face higher frequency of risks. Potentially devastating coping strategies that they engage in include reductions in education spending, selling land, and, to a lesser extent, increasing workloads for respondents. While this appears to be true in the most general sense, important exceptions remain. For example, reducing food spending seems to be a special tool that persists in usage

despite chain membership. In the regression results, we see this as a strategy that as so widely used across VC participants that it is not useful in uniquely describing any particular chain.

Moreover we continue to see important trends in RA/org growers and high value chains that place value on good farming practices. Proponents of value chain approaches who emphasize sustainable production through increased awareness of agroforestry and on-farm diversity would agree with the findings of this study which show that increases productivity and reductions the frequency of risk can go hand in hand (Millard 2011). RA/org growers do not appear to disproportionately face the production risks that many critics describe. To the contrary, chain participants are characterized by relatively high yields, lower risk exposure, and high price expectations. In particular, they face lower levels of 'systemic cheating' which is known to be ubiquitous throughout the cocoa cultivation world.

In much of this analysis, FFV growers seem to be on a slightly different trajectory. On the one hand, some univariate evidence shows that these growers may be less dependent on cocoa as their primary source of income and therefore may be less willing to credit the value chain with increased opportunities for technical assistance, etc. On the other hand, these growers appear to be better managing crop losses and increases in labor costs than conventional growers. Small sample sizes, non-normality, and the immaturity of the FFV program are each contributing to seemingly different results in the multivariate versus univariate analysis when we consider use of financial tools. What does seem clear, however, is that FFV growers likely much more diversified, both in terms of income and off-farm activity, in addition to the tools they use for risk management.

Chapter 7

Review of Findings, Recommendations, and Concluding Thoughts

In a world where cocoa supply appears to be contracting while demand accelerates, investment into smallholder farmers for increased cocoa productivity marches on. Certification schemes that bring buyers and retailers closer to their supply sources will continue to merge with development efforts that aim to provide benefits to smallholder farmers linking to these new market opportunities. Taking advantage of the public and private sector interest means capitalizing on this interest, but not at the expense of policies and programs that fail to understand what the environment for efficient risk management in the smallholder context looks like.

Throughout this thesis we have argued that value chains for development often fail to describe what exactly is being valued. By distinguishing between high value chains that create added-value through certified production-practices and those that create value by tapping niche markets, we proposed a framework to think about how risks and benefits were perceived by growers and how they mitigated shocks when they occurred. By looking at differences between participants in different kinds of value chains, we considered how the *type* of value has important and meaningful implications for the poor people that participate. Following this, we considered if risk perceptions, management tactics, and value chain benefits characterized growers of a particular chain. Looking at cocoa chains in Ghana it is evident that growers face systemic risks that are severe, frequent, and pervasive no matter what value chain an individual participates in.

However, the frequency and intensity of these shocks do appear to differ amongst chain groups – as do expectations for earnings and other perceived benefits of participation.

Findings from Essay 1, Objective 1: Risk Perceptions

Findings from this section showed that cocoa farming requires negotiating some critical systemic risks that are difficult and pervasive no matter which value chain an individual participates in. These included crop loss, escalating labor and input costs, and cheating at the scales. High-value chains appeared to manage some of these systemic risks better as they leveraged partnerships with NGOs and associations in order to access important services. However, for high value growers, complex partnerships often left farmers unsure of who or what was providing these important services. This suggests a missed opportunity for creating farmer-loyalty, raising satisfaction, and retaining participants through 'branded' services.

With a well-known literature in existence on how high-value market participation often perpetuates entry barriers like literacy and basic math skills, capital or technological skill, one would expect to some basic demographic differences between conventional, FFV and RA/org growers. The findings here suggest that growers were similar when it came to education, age, gender, experience, and cultivated land. Some small differences in farm size and age existed, and while those differences were statistically significant, from a policy perspective they do not appear to be too materially different (e.g, chains with growers who have a mean age of 50, compared to a group that has a mean age of 57, are at relative similar life stages). However, while growers were not much different in terms of basic demographics, they did differ greatly in terms of expectations. FFV growers expected prices to be between four to five times higher than

the conventional price. RA/org growers expected double the price of conventional cocoa, with standard deviations between responses being relatively low.

Growers within the three chains all acknowledged systemic risks, but RA/org growers ranked production-related risks relatively higher than any other VC group (in terms of severity and frequency). This is not to say these risks were objectively higher, but rather that RA/org growers ranked production risks at higher positions than price and human/social risks, when compared to other chain groups. FFV growers, like conventional growers, highly ranked a mix of production and price related risks, including transparency related issues related to PC cheating and low premiums/bonuses. RA/org growers suffered from cheating, but the frequency appeared to be less as the RA 'system' lends itself to increasing supply chain transparency by closely linking growers, technical assistants, and buyers (PCs).

Productivity between grower groups, in univariate and multiple regression analysis, illustrated that RA/org growers were not only competing with conventional counterparts in terms of per hectare yields, but that increased yields significantly characterized RA/org members. This is an intriguing finding considering that many critics cite the low yields of the agroforestry system as an indication that sustainability metrics on the ground have short-term consequences that cannot be entertained by the poor. Moreover, increased yields for RA/org did not appear to have come as a result of higher production costs. In fact, RA/org growers were more likely to say their costs were on par with the national average.

Findings from Essay 2: Risk Coping Behaviors

Looking at instances of risk management by dividing risk coping strategies into financial tools, production decisions, and resource allocations, we see that growers clearly preferred them in the aforementioned order—regardless of the chain an individual participates in. When ranking strategies used across risks, it was evident in this analysis farmers were using savings as an objective function, weighting different tools in order to increase or decrease savings and limit consumption reductions. In this study, virtually all growers were able to save some amount of money throughout the year and access some form of credit (formal, informal, or through the PC). Risk ranking by severity and frequency (outlined in Essay 1) often differed slightly from the actual risks growers indicated that they managed.

While all participants choose to manage risk first through savings and financial tools, lender preferences and credit constraints were evident. FFV growers were less concerned about credit through local buyers and were more dependent on social credit extension (from friends and family) as well as formal credit avenues (banks and micro-creditors). Overwhelmingly, RA/org growers utilized the PC as a credit facility and conventional growers used all three options somewhat evenly. Looking at credit preference and credit constraint suggests that FFV growers signaled the least amount of credit constraint. RA/org growers were marginally more constrained, and conventional growers tended to be highly constrained. Valuable future research would look at PC lending, productivity, and community-level liquidity in an effort to understand how the source of credit matters in terms of on-farm productivity and investment.

Manipulation of labor is also an important tool for risk management with each VC group differing in terms of what (or whose) labor to alter first. Regression analysis illustrated that FFV growers are more likely to have household members change or increase employment, while conventional growers are more likely to increase their own workload.

Consumption smoothing and risk management strategies that employ classic poverty-trap behaviors were not commonly used. However, they were never used by FFV growers and very rarely used by RA/org growers. In this study, conventional growers were found to be much more likely to engage in the kind of risk coping strategies known to be potentially damaging to current and future wellbeing. This includes reductions in education spending, selling land, and increasing workloads for respondents. This suggests that despite the higher risk, higher rewards of engaging in high-value cocoa production, growers that are engaging in high-value chains aren't characterized by participation patterns that encourage them to pit household welfare against market opportunities. This is welcomed news for critics of the value chain approach who suggest that farmers are all but required to take on insurmountable levels of risk. However, identifying and monitoring the use of these tools can help policymakers and practitioners hone in on groups and individuals who are clearly suffering from extreme stress, as these 'last-resort' tools signal the desperation that follows after all other options have been exhausted.

Essay 3: Participation Patterns

Risk perceptions and risk coping strategies appear to characterize and influence participation patterns amongst the various cocoa chains analyzed. Analysis in essay 2 and essay 3 confirmed that there are significant differences in what farmers are exposed to (risk exposure), how they

think about it (risk perceptions) and what they do about it (risk coping). A value chain approach needs to take into account the ways in which linking farmers to new markets drives smallholder behaviors and if those behaviors promote the objectives of donors, NGOs, governments, and other individuals and organizations interested in promoting pro-poor solutions to rural poverty, or if they inadvertently perpetuate problems.

Proponents of value chain approaches who emphasize sustainable production through increased awareness of agroforestry and on-farm diversity would agree with the findings of this study which show that increases productivity and reductions the frequency of risk can go hand in hand. RA/org growers do not appear to disproportionately face the production risks that many critics describe. To the contrary, chain participants are characterized by relatively high yields, lower risk exposure, and high price expectations. In particular, they face lower levels of 'systemic cheating' which is known to be ubiquitous throughout the cocoa cultivation world.

In fact, multiple negative correlations amongst high-value chain participants and exposure to risk contrasted against positive correlations between risk exposure and conventional chain participation, suggests that high value chains are distributing risks differently. RA/org participation patterns show no positive correlations between any particular risk exposure and RA/org membership. This suggests that RA/org chain members are not characterized by any measure of relative, extreme vulnerability to any particular risk—including production risks—and that increased frequency of risk exposure is not an inherent aspect of participation.

It was also found that, as in essay 2, certain consumption smoothing strategies are persistent and common across chains. Reducing in food budgets in response to risk is a shared strategy used

even by VC groups that indicate that they are not credit constrained. A normal 'development prescription' might be to increase access to credit, in the hopes that households would borrow before reducing food expenditure, but this would disregard grower preferences to utilize household budgets in the flexible ways they desire. Of course, WE am not advocating that strategies that reduce nutrition and household health are optimal, but merely suggesting that blindly increasing credit access without understanding smallholder motivations behind using other risk management tools can be ineffective at best, dangerous at worst.

Concluding Thoughts

Franzen et al. (2007) suggest that certification systems can buffer the risks of cocoa production and provide important externalities for participating communities. This study finds similar results. Here, we see that RA/org growers face the lowest instances of risk exposure and estimate low levels of price volatility. Few instances of detrimental consumption smoothing tactics are found to disrupt education and health spending and we see little evidence that these growers engage in behaviors that would establish asset-based poverty traps. RA/org growers have similar education levels, income levels, savings rates, family sizes, and dependency on cocoa as their conventional counterparts. Yet in this system we see a chain that emphasizes production practices which in turn deliver on productivity goals and keep costs competitive with country averages.

Multinational chocolate companies and grinders continue to invest heavily in their supply chains towards increased productivity as a result of increasing pressures on cocoa land, climate change, and deteriorating quality. The tradeoff may be that creating a reliance on the certification system

for services may reduce the ability of growers to use benefits like credit for opportunities other than cocoa. Whether or not supplier-driven credit schemes create 'corporate serfs' is question for another research agenda. For now, increasing yields through the certification systems seems to address production inefficiency at the farm level, which can promote growers from being 'tree minders' to focused and strategic cocoa farmers.

In terms of scalability, certification systems that value on production practices can be expanded throughout the cocoa growing world and into different chocolate retail products because these practices ensure standardized quality and increased supply rather than cultivating for a particular trait which may be soon out of vogue. Moreover, niche markets are small by nature. Increased supply will not be met by a matching demand without a significant price plummet. Certification schemes that are focused on farm management practices might do well to offer end-buyers and retailers an opportunity to control supply and invest in increasing productivity on the ground in a broad equitable way. This merges clear trade and business growth with potential development benefits, which is the crux of value chain development. The larger point is, perhaps, that all value chains are not valuable because they are value chains. What is being valued really seems to make a difference if we are attempting to bridge development goals with economic growth.

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APPENDIX

FARMER HOUSEHOLD SURVEY
SUBJECTIVE RISK ASSESSMENT

High Value Cocoa Chains in Ghana

For Interviewer to fill out:

Interviewer Name: _____ Date_____

Time Started: _____ Time Ended_____

Household Number: Village Name:

_____ _____

Start Note: This survey should be undertaken with the primary grower of cocoa in the household. Please advise the grower that we are speaking with him/her about the type of cocoa indicated in the box. I.e., if the grower is labeled as a Fine Flavor grower, he/she should respond to questions by referencing that particular type of cocoa and not other varieties that the producer may grower concurrently.

Section A - GENERAL INFORMATION

1. Respondent name: _____ (optional)

2. Respondent age_____

3. Respondent gender:
1=Male
2=Female

4. Which of the following apply to you?
1=I own my land and grow my cocoa
2=I have a caretaker for my cocoa farm
3=I am a caretaker for the cocoa farm

5. Is this grower in transition to organic?
1=Yes
2=No

Section B - HOUSEHOLD CHARACTERISTICS

Prompt: We want to know a bit about who lives here, how you live, and what your daily life is like.

1. Do you or your family own this dwelling?
1=Yes (if yes, skip the following question)
2=No

2.What is the main floor covering for this dwelling?
1= Earth/Mud,
2=Wood,
3=Stone/brick,
4=Fiberglass,
5=Cement/concrete
6=Other (specify)

3.How many people live in this house?
Amount of people: _____

4.How many of the people who live in this house are your children?
Number of children who live in your house: _____

5.How many of the children who live in your house are under 5 years old?
Number of children under 5_____

6.What is your schooling level?
1=Basic
2=Middle
3=Secondary
4=Tertiary
5=Other (specify)_____
6=0 (None)

7. How far is your farm from the main road?
1=Less than 15 minutes walking
2=Less than 30 minutes walking
3=Less than 1 hour walking
4=More than 1 hour walking

Section C - PRODUCTION AND SELLING

Prompt: Now we want know about how you farm and about the types of cocoa you grow and why you grow them. We will ask also about your experiences growing cocoa, good yields and bad, and what you consider high and low prices to be. Some of these questions ask you to give estimates or guesses about prices or yields in the future. Of course there are no wrong answers. What we are interested in is how you think about these important decisions.

1. How many total acres do you currently farm; including land rented, sharecropped, or owned.

Amount (acres) _____.

**Make sure to ask about ALL plots including those that the individual is the caretaker of. All the following questions in this survey will be asking about ALL these pieces of land put together as a total "farm".*

Plot	**Size (acres)**	**Who is the primary cultivator of this land?** 1=Respondent 2=Caretaker 3=Other	**What is the plot primarily used for?** 1=cocoa 2=other crop	**If this plot is used for cocoa, do you grow:** 1=Fine flavor 2=Rainforest Alliance Organic 3=Conventional	**Do you own, sharecrop, or rent this land?** 1=Own 2=Sharecrop 3=Rent	**How much cocoa does this plot typically produce?** (bags/plot)
Plot 1						
Plot 2						
Plot 3						
Plot 4						
Plot 5						

2. What do you consider to be your primary occupation?
1=Farmer
2=Teacher
3=Driver (taxi, bus, truck)
4=Business owner (shop, pharmacy, office)
5=Trader
6=Carpenter/Masonry/Construction
7=Other _____ (specify)

3. Do you have a secondary occupation? If so, please tell us….
1=Farmer
2=Teacher
3=Driver (taxi, bus, truck)
4=Business owner (shop, pharmacy, office)
5=Carpenter/Masonry/Construction
6=Other _____(specify)
7=I have no secondary occupation.

4. For how many years have you been cultivating cocoa?
_____ (years)

Prompt: Tell us more about the types of cocoa that you currently grow. What was the year that most of the trees were established for each type of cocoa you currently grow? What are the planting distances used? Do you use inputs?

5.

Type of cocoa	**Average age of cocoa trees (number of years old)**	**Do you use inputs? (Yes/No)**
1. Conventional		
2. Fine flavored		
3. Rainforest Alliance Certified Organic		

6. Do you have plans to start growing a new type of cocoa in the next year?
1=Yes What kind? Specify:_____ (1= Fine Flavor, 2= Rainforest Alliance Organic, 3=Other, (i.e., UTZ, Fairtrade etc.)).
2=No. Not in the next year.

Prompt: Cocoa can be intercropped with other types of crops that you and your family might eat or sell. We want to know if intercropping is done on the plots you cultivate and how they contribute to your income.

7. Do you intercrop your cocoa with other crops that you sell for income?
1=yes
2=no (If no, skip to question 12)

8. How much do these other crops (non-cocoa) contribute to your yearly income?
1=They contribute to more than half of the household income (<60%)
2=They contribute to about half (50%, +/- 10)
3=They contribute to much less than half (>40%)

Prompt: Now we're going to talk a bit about production practices and how you farm cocoa…

9. The average cost of production of conventional cocoa is around 922.50 cedi per acre. Would you say that this figure is:
1=**Much higher** than my cost of production last year
2=**Higher** than my costs of production last year
3=**Almost or exactly** my costs of production last year
4=**Lower** than my costs of production last year
5=**Much lower** than my costs of production last year

10. Which production cost represents your biggest seasonal cost for your cocoa?
1=Fertilizer
2=Agrochemicals (fungicides, etc.)
3=Paid labor
4=Post-harvest costs (transportation, packing, etc.)
5=Seedlings
6=Tools
7=Other (specify) _____

Prompt: Now we'll ask you a bit about any problems with your cocoa crop over the years…

11. In the last **two** years have you lost any of your cocoa yield to pests, diseases, weather, etc.? Tell us what the source of crop failure was, how many bags of cocoa you lost per acre, and give us a sense of how much money was lost as a result...

Variety type	**Amount of crop lost (bags/acre)**	**Source of crop failure (choose most severe)** 1=Rodents 2=Fungus (Black pod) 3=Disease (Swollen shoot, etc.) 4=Pests (Mirids, etc.) 5=Bad weather 6=Tree death from grafting/transplanting
Conventional		
Fine flavored		
Rainforest Alliance Certified Organic		

Prompt: Now, we want to know more about premiums and bonuses and what the highest, lowest, and normal prices you may receive for your cooca….

12. For your harvest this year, what do you expect to be the highest, lowest, and most likely premium or bonus that you could receive?

Type	**Highest expectation (GH per KG)**	**Lowest expectation (GH per KG)**	**Normal expectation (GH per KG)**
Fine Flavor Premium			
Rainforest Alliance Premium			
Organic Premium			
Bonus (Conventional)			

13. Did you receive a bonus or premium last year (2009-2010) for your cocoa?
1=Yes
2=No (skip following question)

14. If you did receive a bonus or a premium last year was if for:
1=Rainforest Alliance
2=Organic
3=Conventional
4=Other (Fairtrade, UTZ)

15. How much premium did you receive last year? (GH per KG)

_____

Prompt: Regarding your yields, what do you expect your future yields to be? What are the highest and lowest possible yields you could have? UNITS= BAGS PER ACRE.

16.

Type of cocoa	**Highest possible yield** (bags per acre)	**Lowest possible yield** (bags per acre)
Fine Flavored		
Rainforest Alliance Organic		
Conventional		

Prompt: Now we want you to think about the cocoa premiums and bonuses you've experienced in the past… In your memory what's the best and worst premium/bonus you've received for cocoa?

17.

Type of cocoa	**Best premium ever received (GH per KG)**	**Year**	**Lowest premium ever received (GH per KG)**	**Year**
Fine Flavor Premium	NA	NA	NA	NA
Rainforest Alliance Premium				
Organic Premium				
Bonus (Conventional)				

Prompt: In your memory, what were your highest and lowest yields per acre?
18.

Type	**Highest yield in memory (Bags/acre)**	**Year**	**Lowest yield in memory (bags/acre)**	**Year**
Fine Flavor	NA	NA	NA	NA
Rainforest Alliance				
Conventional				

19. How do you transport your cocoa to the purchasing clerk?
1=I sell to a buyer (PC) who comes to my farm.
2=I pay someone else to take it to the buyer for me.
3=I transport my own cocoa to the buyer (PC).

Section D- Perceived Risks and Benefits of VC Participation

We want to know more about why you choose to cultivate cocoa, your buyers, and any cocoa associations you participate in…

1. Do you participate in a cocoa producers organization? You may circle more than one.
1=Yes
2=No (skip following question)

2. If yes, which type of association do you participate in?
1=Offin Fine Flavor Cocoa Association
2=Nyinahini Rainforest Alliance Organic
3=Ntobroso Organic Farmers Association
4=Conventional growers association. (Specify) _____

Prompt: We want to know about the benefits that you receive for producing cocoa. We will go through a list of benefits / supports and you can tell us which benefits you feel like you receive, how important that particular benefit is to you, and the organizations who help provide it to you….

3.

Type of benefit	**Do you receive this benefit/ support?** 1=Yes 2=No	**Who provides this benefit/ support to you?** 1=Association 2=NGO 3=Government 4=LBC/PC 5=Other _____	**Do you believe this benefit/support to be only available through the organization that gave it to you?** 1=Yes 2=No 3=Maybe	**How important is this benefit/support to you?** ***Scale from 1-10*** 1= Not very important 10=Extremely important
Trainings and technical assistance (e.g., grafting, landing and pegging)				
Better access to technology or farm inputs (including cocoa seedlings and shade trees)				
Lower cost for chemicals and fertilizer (including organic manure)				
Premium or bonus				

Access to credit (including cash and loans of fertilizer that are repaid at end of the season and other non-monetary assistance)				
Other (specify)				

4.What types of cocoa have you produced in the past, but no longer grow today?
1=Fine Flavor
2=Rainforest Alliance Certified Organic
3=Conventional
4=Other high value/distinguishable type like UTZ or Fairtrade (specify) _____
5=I have never changed cocoa (Skip next question).

5. If you did cultivate a different type of cocoa in the past, how did you feel about your experience with that system?
1=Strongly positive
2=Positive
3=indifferent/ neutral
4=Negative
5=Strongly negative

6. Have you ever been part of an certified cocoa group that has lost its certification?
1=yes Specify: _____.
2= no

7. If a family member or a friend asked you for advice on what type of cocoa to grow, what
would you recommend?
1=Grow a higher value cocoa (like rainforest alliance, fine flavor, or organic)
2=Grow Conventional cocoa
3= I would recommend that they not grow cocoa at all.

Prompt: We want to ask you now about how you view the risks that you and your association face in cocoa…

8. Types of risks faced:

Code list for coping strategies:

1= none
2- sold land (specify home/agricultural)
3=Mortgaged/leased land
4=Sold productive asset (tools, etc.)
5=Reduced food spending (ate less)
6=Took children out of school
7=Reduced savings
8= Reduced spending on health/medicines
9= Respondent took on another job or increased work load.
10=Another member of the household got another job
11=Household member changed their occupation to earn more
12=Respondent took help from others
13=Took out a loan, accessed credit

Type of risk	**Have you experienced this in the last five years?** 1=Yes 2=No	**How often? Scale 1-5** 1=Happens regularly 5=Very rarely	**How severe do you feel this risk is for you? 1-5 scale** 1=Not very severe 5=Extremely severe	**If this negative event occurred, how would you cope?** *Choose top three strategies (no less than 2). See coping strategies below*	**What groups / organizations do you rely on to help reduce the possibility of this risk negatively affecting you?** 1=Association 2=NGO 3=Government 4=LBC/PC 5=Other _____ 6. None
Crop losses due to disease, and pests.					
Loss of productive asset due to theft, bad weather,					
Decreased bean quality due to problems with transportation, fermentation, etc.					
Increased input prices (chemicals, fertilizer, etc)					
Increased labor costs and unavailability					
Receiving low premium or bonus for cocoa					
Risk of cocoa not being certified					

Buyers adjust the scale and a fair price is not given.					
Type of risk	**Have you experienced this in the last five years?** 1=Yes 2=No	**How often? Scale 1-5** 1=Happens regularly 5=Very rarely	**How severe do you feel this risk is for you? 1-5 scale** 1=Not very severe 5=Extremely severe	**If this negative event occurred, how would you cope?** *Choose top three strategies (no less than 2). See coping strategies below*	**What groups / organizations do you rely on to help reduce the possibility of this risk negatively affecting you?** 1=Association 2=NGO 3=Government 4=LBC/PC 5=Other _____ 6. None
Death of family member					
Loss of income due to illness/injury					
Loss of income due to necessary social expenses (marriage, funeral)					
Divorce / separation					
Other (specify)					

9. I will continue to produce the cocoa I grow for the long term- even if prices go down.
1=Strongly agree
2=Agree
3= Indifferent or neutral
4=Disagree
5=Strongly disagree

Question 10, 11, 12 ***ONLY apply to growers who grow high value****, Fine Flavor and/or Rainforest Alliance Organic cocoa:*

Now we want to talk about risks you feel you face with higher value cocoa production versus other types of cocoa: How do you agree with the following statements?

10. Growing higher value cocoa takes more skill and knowledge than growing regular cocoa:
1=Strongly agree
2=Agree
3=Do not feel one way or the other
4=Disagree
5=Strongly disagree

11. I feel that growing higher value cocoa is more risky than growing regular cocoa:
1=Strongly agree
2=Agree
3=Do not feel one way or the other
4=Disagree
5=Strongly disagree

12. I feel that I understand all the risks associated with higher value cocoa:
1=Strongly agree
2=Agree
3=Do not feel one way or the other
4=Disagree
5=Strongly disagree

*Questions 13-17 are ONLY for growers who **ONLY grow conventional cocoa:***

13. Have you ever considered producing higher value cocoa like Fine Flavor, Organic, or Rainforest Alliance Certified cocoa?
1=Yes
2=No

How do you agree or disagree with the following statements?

14. I have never grown higher value cocoa because the opportunity has never been made available to me.
1=Strongly agree
2=Agree
3= Indifferent or neutral
4=Disagree
5=Strongly disagree

15. I am not really sure about the costs or benefits about high value cocoa.
1=Strongly agree
2=Agree
3= Indifferent or neutral
4=Disagree
5=Strongly disagree

16. I have never grown higher value cocoa because it seems too risky.
1=Strongly agree
2=Agree
3= Indifferent or neutral
4=Disagree
5=Strongly disagree

17. I have never grown higher value cocoa because I don't think it will be profitable for me.
1=Strongly agree
2=Agree
3= Indifferent or neutral
4=Disagree
5=Strongly disagree

Section E- INCOME AND ASSETS

People have to make difficult choices when it comes to how they make and use money. We want to ask you a few questions about your income, what you do with it, and how you feel about your level of credit and access to money for your farm, business, and family. You can be sure that this information is confidential and won't be shared with anyone else. All personal information tying you to any of these numbers will be destroyed.

Prompt: What was your total household yearly income last year (2010) from cocoa, other crops, and any off farm income... (if farmers can only give net income, that is okay)

1.

Type of income	**Total Revenue** **NOT applicable for fine flavor*	**Total Farm Expenses**	**Net Income**
Income from cocoa			
Other crops on the farm			
Off farm income (labor, business, etc.)			NA

2. What do you estimate your total income AFTER expenses, including farm income, that you and other wage earners in your house will earn, this year, in 2011?

Highest possible income (GH)	**Lowest possible income (GH)**	**Most likely income (GH)**

3.In your memory, what's the highest and lowest yearly income, AFTER expenses, for your household?

Best income in memory **(total GH per year)**	**Worst income in memory**	**Normal income**

Now we want to ask you about how you use money, including how and if you save money, and what kinds of purchases you save for…

4. Are you able to save any money?
1=Yes
2=No

5. If you do save money, how do you save it?
1=Through a bank/formal savings account.
2=In a village savings account
3=Informally (keep in house, etc.)
4. I buy something that I can later resell (animals, jewelry, equipment)

6.What do you save for?
1= Emergencies and difficult times- to be spent on future basic needs (housing and food)
2= A future social event (wedding, funeral)
3= Better healthcare and medical needs
4= Schooling and school fees for my children
5= Home repairs or construction
6= To buy something for the house /family (TV, refrigerator, computer)
7= To buy something for the farm (to invest in a productive asset)
8= To buy something for myself
9= Other _____

7. If you wanted to take a loan, where would you go?
1= Purchasing Clerk (PC)
2= Bank
3= Local microfinance organization
4= Moneylender
5= Village savings association
6= Family
7= Friends / other villagers
8= Other (specify) _____

8.Have you ever attempted to take a formal loan?

1=Yes
2=No

9. If yes, were you qualified?
1=Yes
2=No
3=I never tried

10. If you were qualified to take a loan, who did you choose to take a loan with?
1= Purchasing clerk
2= Bank
3= Local microfinance organization
4= Moneylender
5= Village savings association
6= Family
7= Friends / other villagers
8= Other (specify)_____

11. If you choose to take this formal loan, what was the interest rate?
_____% / _____ (percent / year or month (indicate whether month or year)).

12. If you've never tried to take a loan, why not?
1= I **didn't need a loan.**
2= **I could have afforded it, but it seemed too risky** so I chose not to.
2= I didn't think I would ever be able to pay it off; **the interest makes it too expensive** for me.
3= I knew **I didn't have enough collateral**
4= A loan **option wasn't available** to me
5= I **did not want to risk my collateral**

13. If you did take a loan, were you able to take out enough money for your needs?
1=Yes, it was enough for my needs
2=No, it was not enough
3= I did not take out a loan

14. What did you use the funds for?
1= To meet the basic needs of my family (housing and food)
2= A social event (wedding, funeral)
3= Healthcare and medical needs
4= Schooling and school fees for my children
5= Home repairs or construction
6= I bought something for the house /family (TV, refrigerator, computer)
7= I invested in/bought something for the farm (a productive asset, certification fees, etc.)
8= I bought something for myself
9= Other _____

15. Have you paid this loan off?
1=Yes
2=No

16. Have you ever defaulted on a loan payment?
1=Yes
2=No

17. How do you feel about the availability of credit to you?
1= It's more than sufficient - I can always get it when I need it
2=I can get some credit, but it's a hard process and not always enough
3= I always feel constrained by money. I very rarely have access to any form of credit.

18. Do you have any other outstanding debt besides the above mentioned loan?
1=Yes
2=No

19. To whom do you owe this outstanding debt to?
1=Family member
2. Friend /other villager
3=Purchasing clerk
4=Other (specify) _____
5=I have no other debt.

20. Are you stressed or concerned about your loan and/or debt level? (Either to pay it off or meet your monthly financial obligations?)
1=Not concerned
2= Occasionally concerned
3=Very concerned
4=Extremely concerned

Section F-PERCEPTIONS OF POVERTY

1.Concerning your family's food consumption over the past 12 months, which of the following is true?

Our food consumption is:
1=Adequate
2=Less than adequate
3=More than adequate

2.Concerning your family's housing over the past 12 months, which of the following is true?

Our housing is…
1=Adequate
2=Less than adequate
3=More than adequate

3.Concerning your family's health care over the past 2 years, which of the following is true?

The health care our family receives is…
1=Adequate
2=Less than adequate
3=More than adequate

4. Concerning your family's schooling over the past 2 years, which of the following is true?

The schooling my children receives(received) is:
1=Adequate
2=Less than adequate
3=More than adequate

5. Compared to other households in this village, would you describe your household as…
1= The richest
2=Richer than most
3=Average
4=Poorer than most
5=Among the poorest
6=The poorest

6.In terms of meeting the basic needs of your household, would you say you are better off, the same, or worse than this time 1 year ago? (e.g. making ends meet)
1=Much better now
2=A little better now
3=No change
4=A little worse now
5= A little better now
6=Much worse now

7. In terms of meeting the basic needs of your household, would you say you are better off, the same, or worse than this time a 5 years ago?
1=Much better now
2=A little better now
3=No change
4=A little worse now
5= A little better now
6=Much worse now

8. Which of the following would you say about your income?

My income:
1=Allows us to save a lot
2=Allows us to save a little
3=Only meets expenses
4=Is insufficient
5=Is really insufficient